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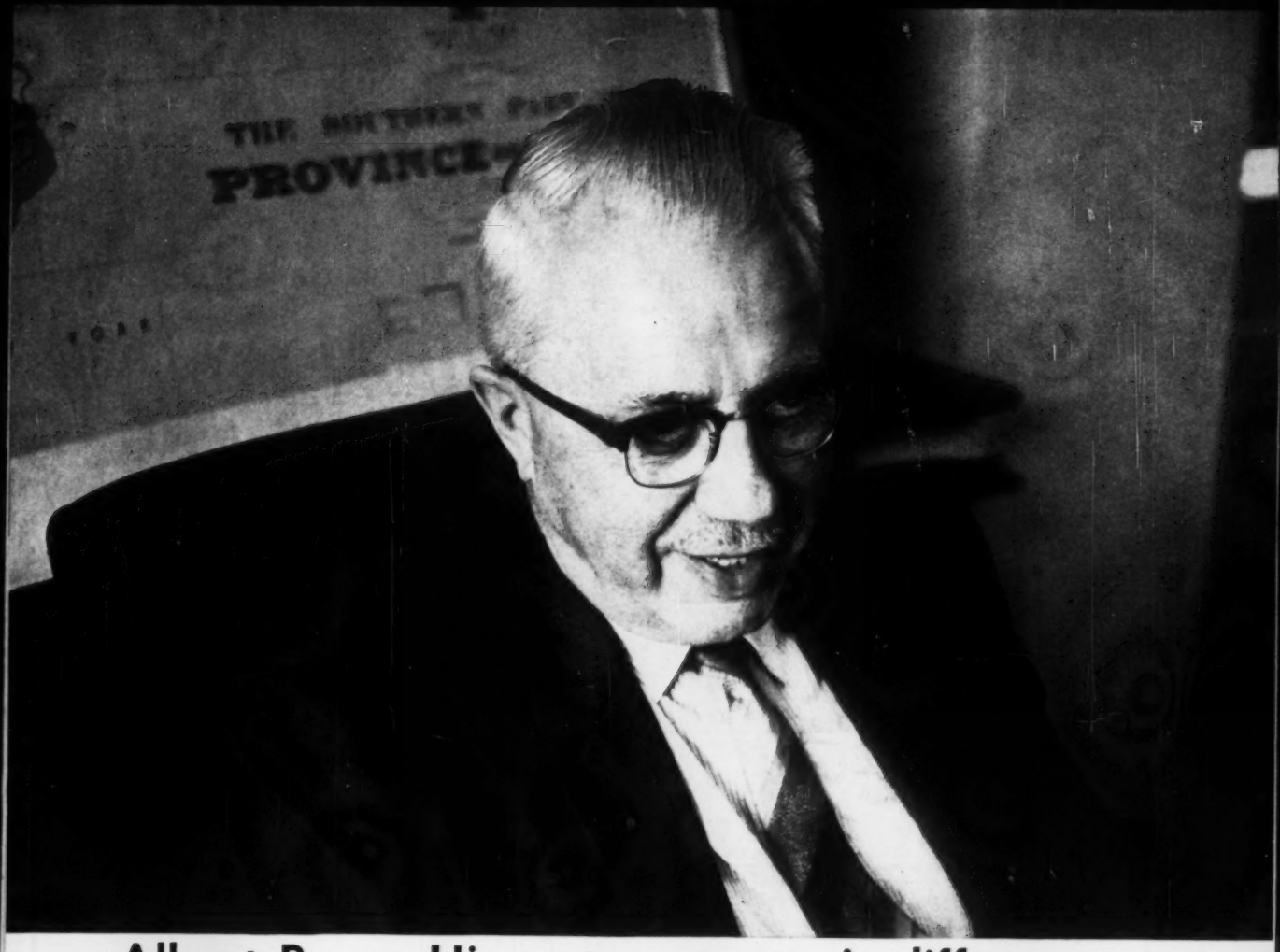

Albert Berry: His water agency is different p.46

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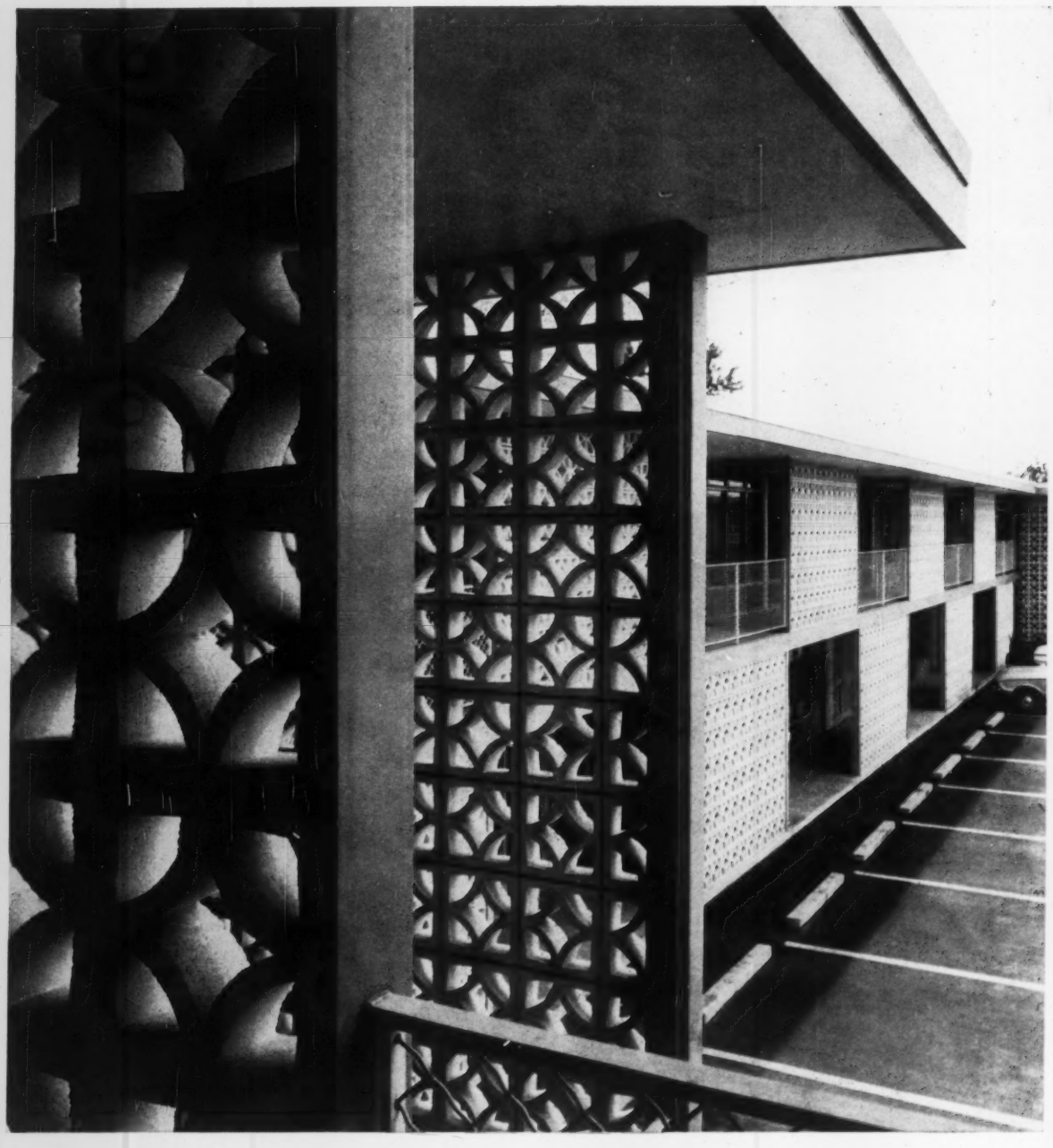

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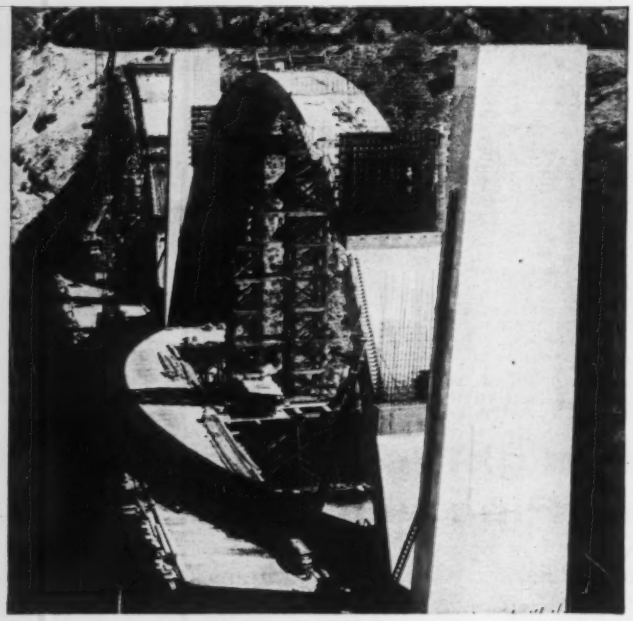

ONE OF THE FIRST THERMIT-WELDED RE-BAR JOBS was this Western Pacific Railroad bridge over the North Fork of the Feather River. #18 and #11 bars from Ryerson were welded end to end so that continuous tendons of steel up to 460 ft. long reinforce each giant arch. And Ryerson deliveries were dependably on schedule despite inaccessible back-country location of project. **Consulting Engineers:** Woodruff & Sampson, San Francisco. **General Contractor:** Pacific Bridge Company, Alameda, California.

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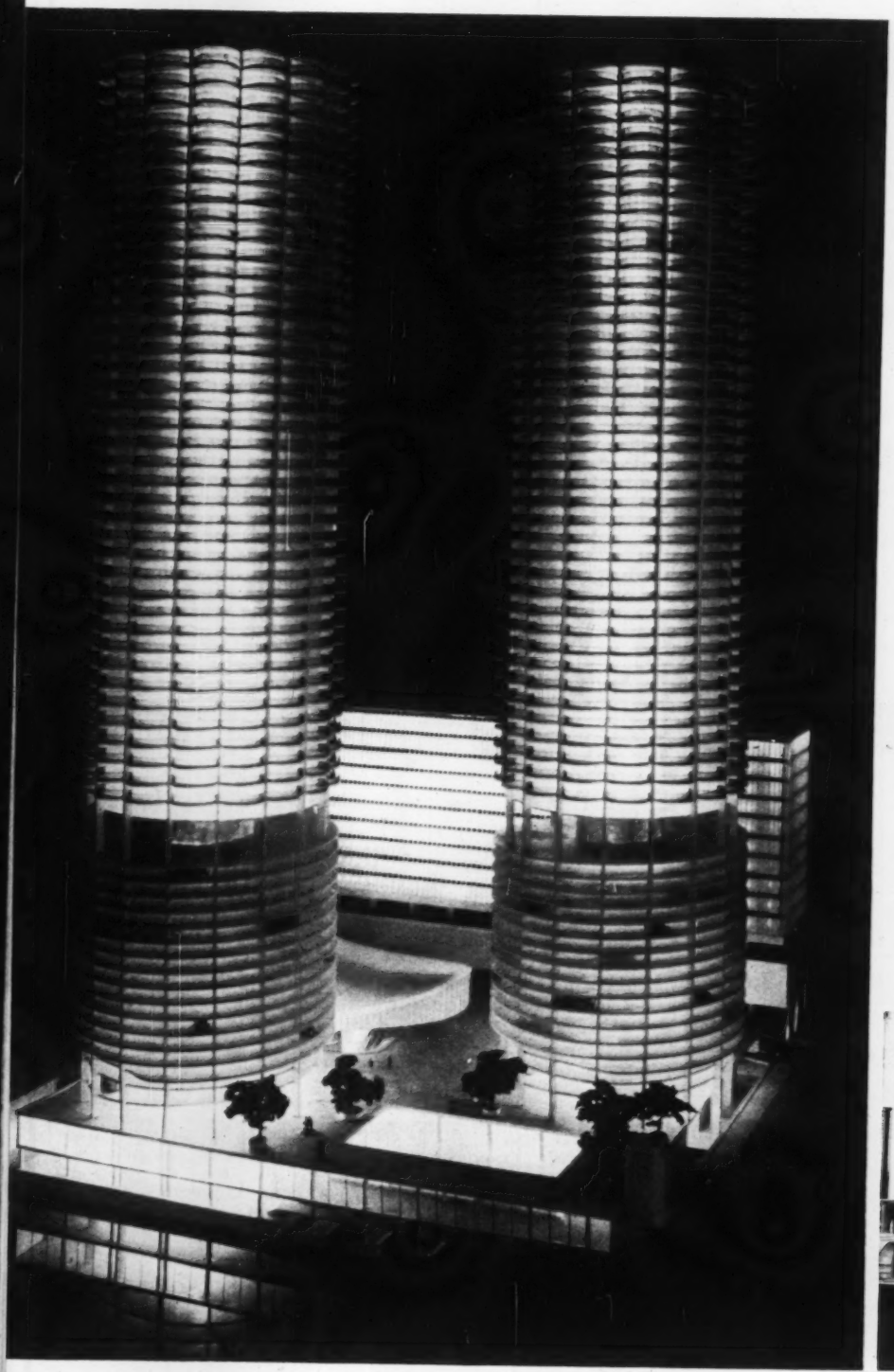

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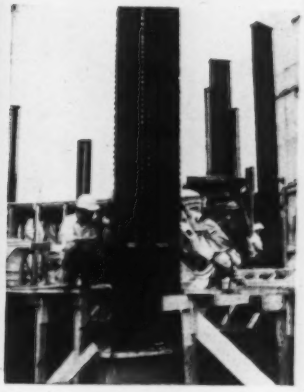

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Reader Comment

In Defense of SJI Specification

SIR—I would like to answer some of the points you bring out in your editorial, Joist Spec Needs Revision (ENR July 20, p. 126).

I am chairman of the Steel Joist Institute Research Committee. This committee established the basic concepts of the SJI specification through research carried out by the SJI and member companies. When the SJI high-strength research program at Washington University (St. Louis) reached its final conclusions early in 1961, the SJI Engineering Practice Committee joined with the Research Committee for the final writing of the high-strength (H-Series) specification. The SJI Board of Directors approved the specification in June. (It is necessary to gain approval by over three-quarters of the Board for any specification changes.)

It is evident from the contents of your editorial that the proper officials of the Steel Joist Institute were not consulted prior to its publication. The many years of engineering and research that have been carried on by the SJI and its member companies have given the organization the experience and technical know-how to limit the designs of open-web steel joists. It is an organization in which every member can have his say, but no member or group of members can run the show.

Through the SJI, standard specifications and load tables have been set up with the National Bureau of Standards so that architects and engineers throughout the country can choose a standardized product for their buildings. This has resulted in a widely accepted, well engineered product for which research, testing and mathematical calculations are checked by top authorities.

For their own reasons, some steel-joist manufacturers have chosen to set up their own standards. Editorials such as yours can enhance such a trend away from standardization and result in chaos for both the producer and the purchaser of steel joists.

The whole objective of the SJI is to insure standard uniform joists of the highest quality. I believe it would be most unfortunate if users of steel joists were to receive from your editorial an impression of these joists that does not accord with the true situation.

The material requirements in the new specification for high-strength steel joists are ASTM specifications. Three of the five specifications given are part of the "Specification for the Design of Light-Gage Cold-Formed Steel Structural Members" of the American Iron and Steel Institute. The A36 specification is included in the American Institute of Steel Construction "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings." The A242 specification for "High-Strength Low-Alloy Structural Steel" covers high-strength, low-alloy structural-steel shapes, plates and bars. It applies to welded or riveted construction intended primarily for use as structural members where saving in weight and atmospheric corrosion resistance are important. (The SJI deleted the atmospheric corrosion resistance requirement because steel joists are seldom exposed to corrosion.)

This was the only ASTM specification available to the committee for a high-strength steel in which the alloying medium, if needed, was left open to the steel producer. We did not wish to specify a commercial grade of steel such as A415, because this would take away from the SJI specification any limitation on chemistry of the steel.

Inspection of the final product was left the same as in the present specification. There has never been any question as to the right of any purchaser at all times to inspect the material and workmanship of steel joists at the manufacturer's plant. I am sure that the SJI would be glad to add anything that would make this point clearer in the specification; but I am sure that this will not give to the purchaser any inspection rights that are not already available to him.

Marking of various grades of steel by tagging or painting the ends of the bars in various colors has been standard practice throughout the steel industry for many years. If we find it necessary, the SJI would be glad to specify certain steel marking practices in the SJI "Code of Standard Practice."

W. E. BRADBURY
Manager
Product Engineering & Development
Sheffield Division, Armco Steel Corp.
Kansas City, Mo.

No Spoonerism Intended

SIR—In the column Around the World (ENR Aug. 24, p. 26), item Long Arch Opens, the towns described as Rudnes-Wincorn should read, of course, Runcorn-Widnes.

(Mrs.) M. DAWN HAMER
Wilmington, Del.

(Reader Comment Continued p. 10)

Engineering News-Record welcomes expression of opinions from its readers. Comment should be as brief as possible and pertinent to subjects of current construction importance. Letters should be addressed Editor, Engineering News-Record, 330 W. 42nd St., New York 36, N. Y.

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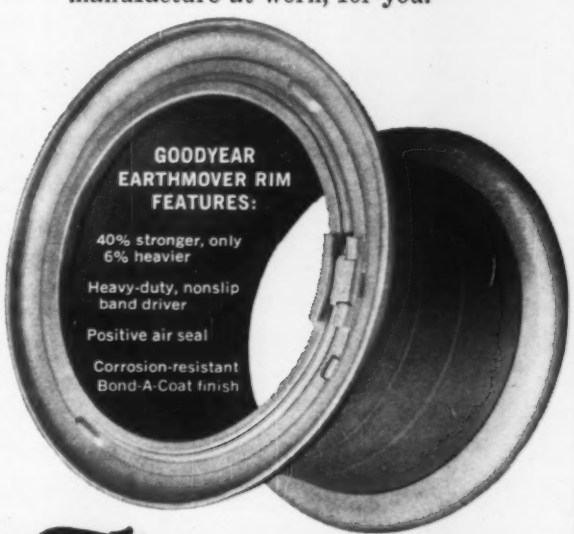
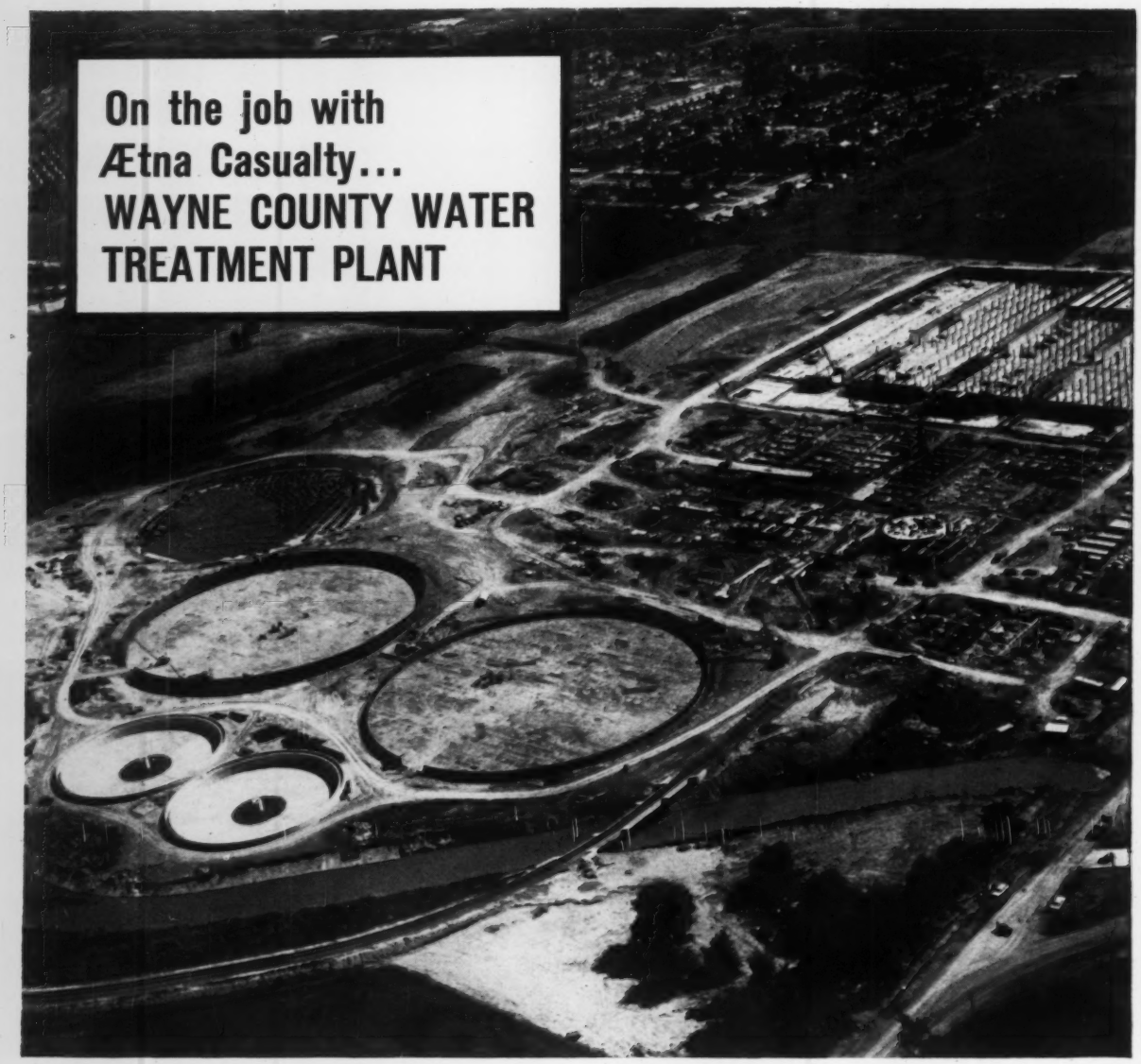


Lots of good things come from

GOODYEAR



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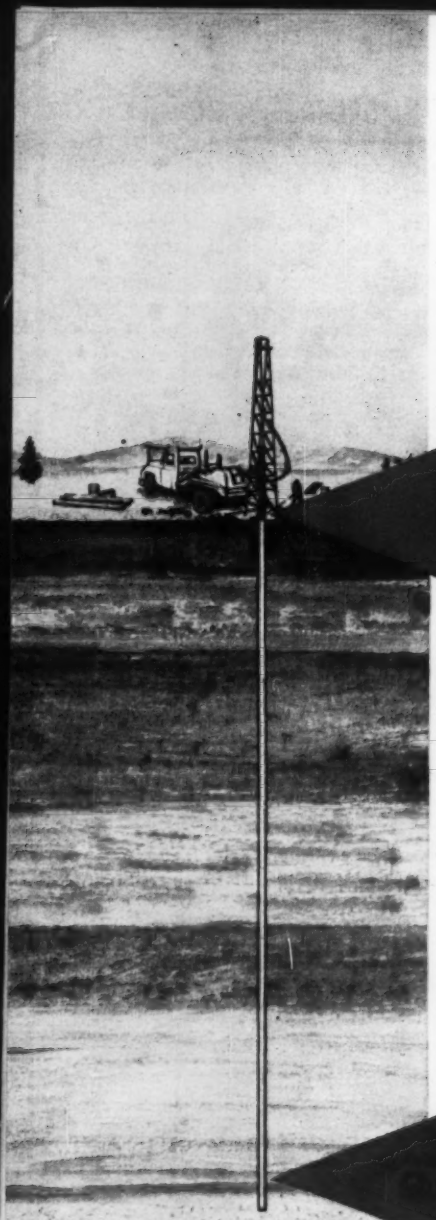

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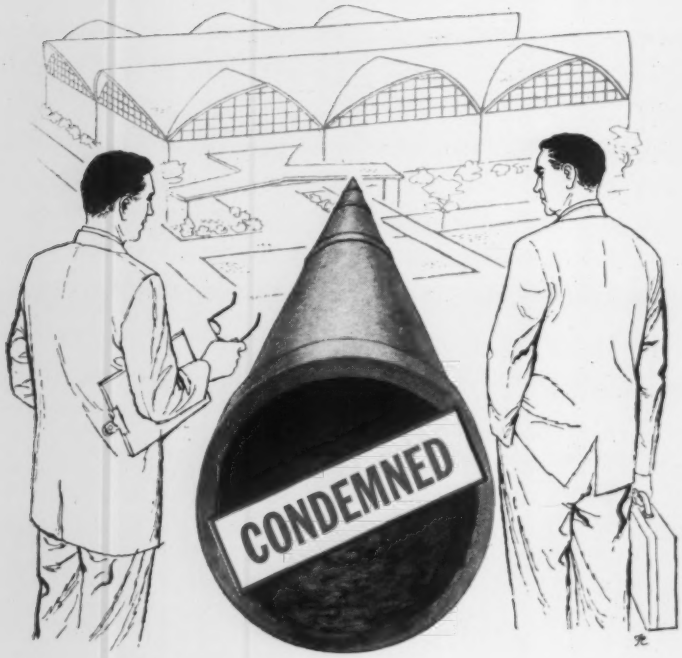

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. . . Reader Comment

Esthetics vs Economics

SIR—Far be it from me to accuse fellow engineers of possessing any artistic or esthetic sensibilities. Thus, your editorial in the June 29 issue entitled Dry Feet for Ramses was just about what I expected from you birds.

Apparently, if the archaeological and cultural treasures of antiquity cannot show a profit and require some investment to assure their preservation, then to hell with them!

Besides, those stupid ancient Egyptians should have known better than to carve their fool sculptures below the flood plain of a dam to be built 3,000 years later.

I am sure that if you boys felt that the Parthenon would show a profit by its re-use as a powder magazine, you would be only too happy to advocate it.

GORDON D. FRIEDLANDER
White Plains, N. Y.

Editor's Note—Not us. After the big blowout of 1687, when the Turks got the Parthenon loaded, we are convinced the place is hexed.

Conrad Zschokke, Too

SIR—We were somewhat disappointed to notice that you ended the article Caissons Dig Out a Seven-Story Basement (ENR July 6, p. 42) by referring to the builder as a combine of three firms of which you mentioned two by name and omitted ours.

As head of the combine and as specialists in sinking caissons for over eighty years we have carried the main burden and responsibility of this unusual contract. We are glad to inform you that this job was completed successfully.

M. DUBOIS
Conrad Zschokke Ltd.
Geneva, Switzerland

Editor's Note—Our apologies for a particularly unfortunate typographical omission. The correct combine is Zschokke, Spinedi and Losinger.

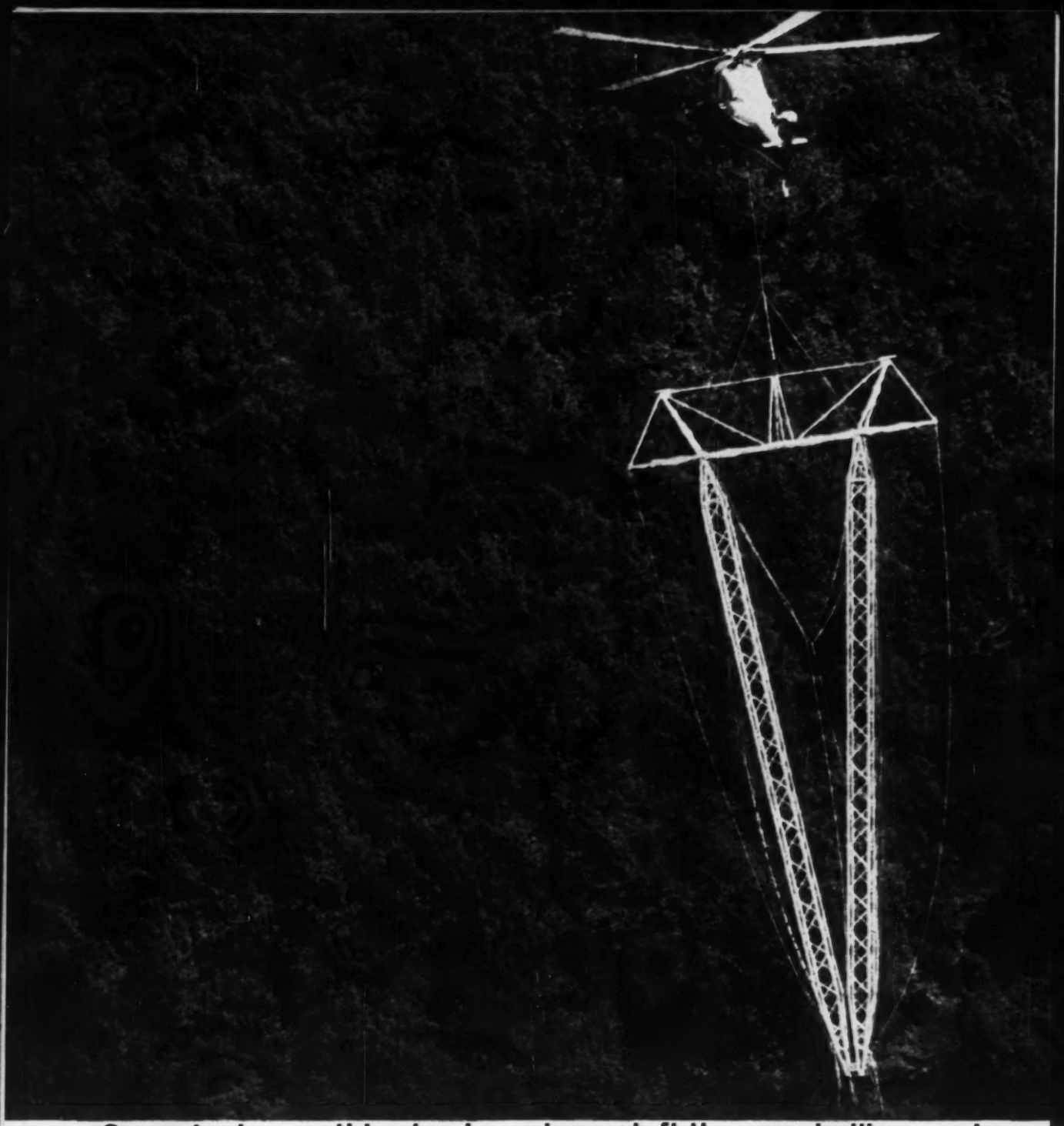
For Your Calendar . . .

American Institute of Consulting Engineers, annual dinner meeting, Waldorf-Astoria Hotel, New York, N. Y., Oct. 17. Write: AICE, 345 W. 47th St., New York, N. Y.

Consulting Engineers Council, semi-annual meeting, Golden Gate Hotel, Miami Beach, Fla., Nov. 2-4. Write: CEC, 326 Reisch Building, Springfield, Ill.

U. S. Government Construction Contracts Conference, conference and dinner, Lisner Auditorium, George Washington University, and Statler-Hilton Hotel, Washington, D. C., Nov. 6-7. Write: Construction Contracts Conference, The National Law Center, George Washington University, Washington 6, D. C.

Atomic Industrial Forum, annual conference, Conrad Hilton Hotel, Chicago, Ill., Nov. 6-8. Write: AIF, 850 3rd Ave., New York 22, N. Y.



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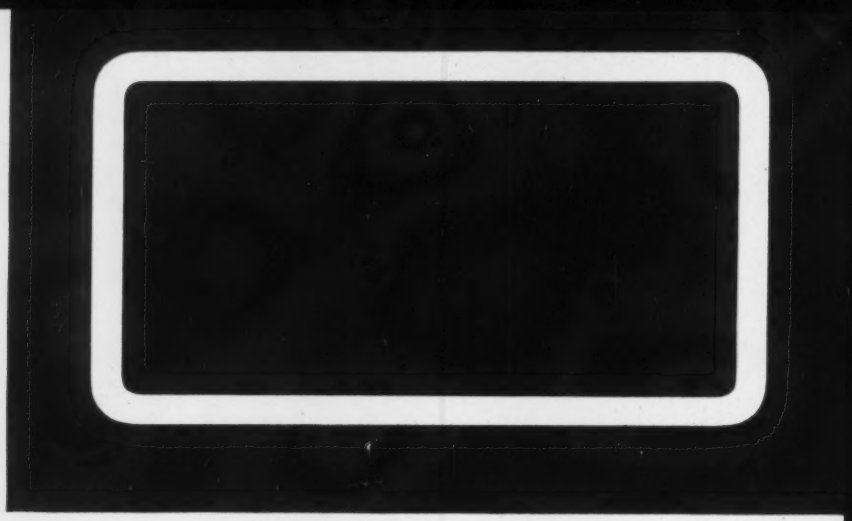

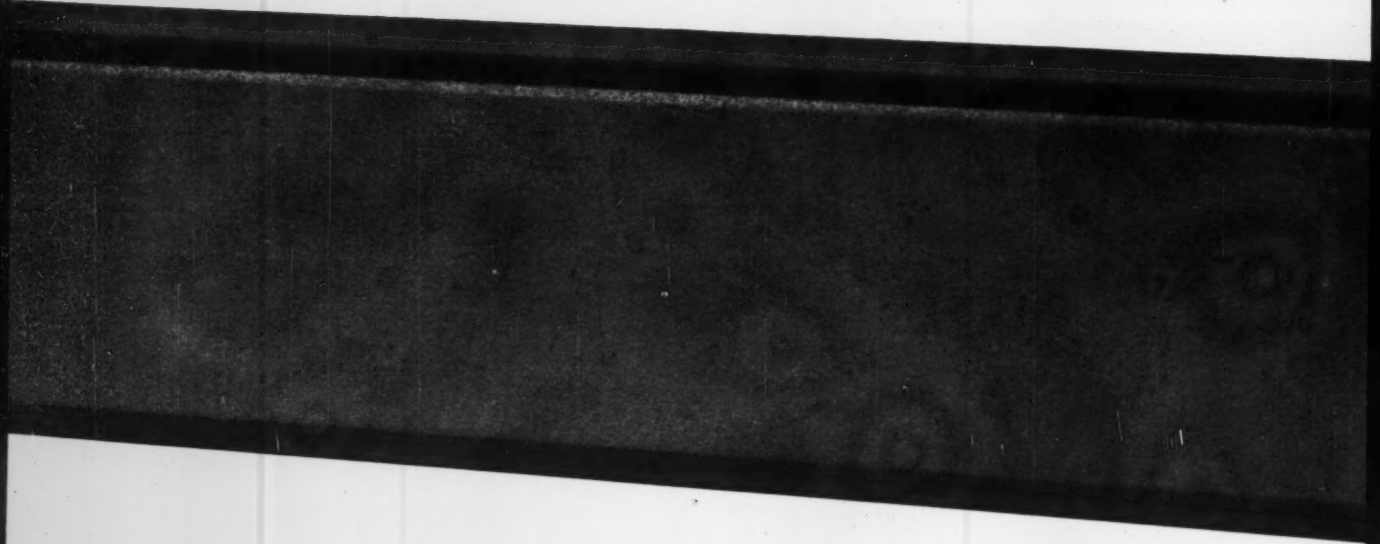

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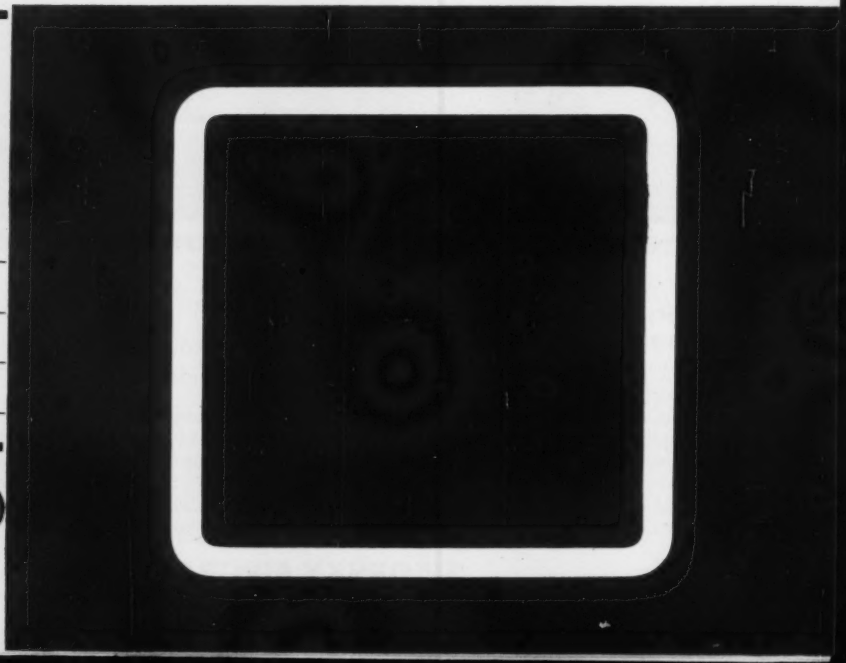

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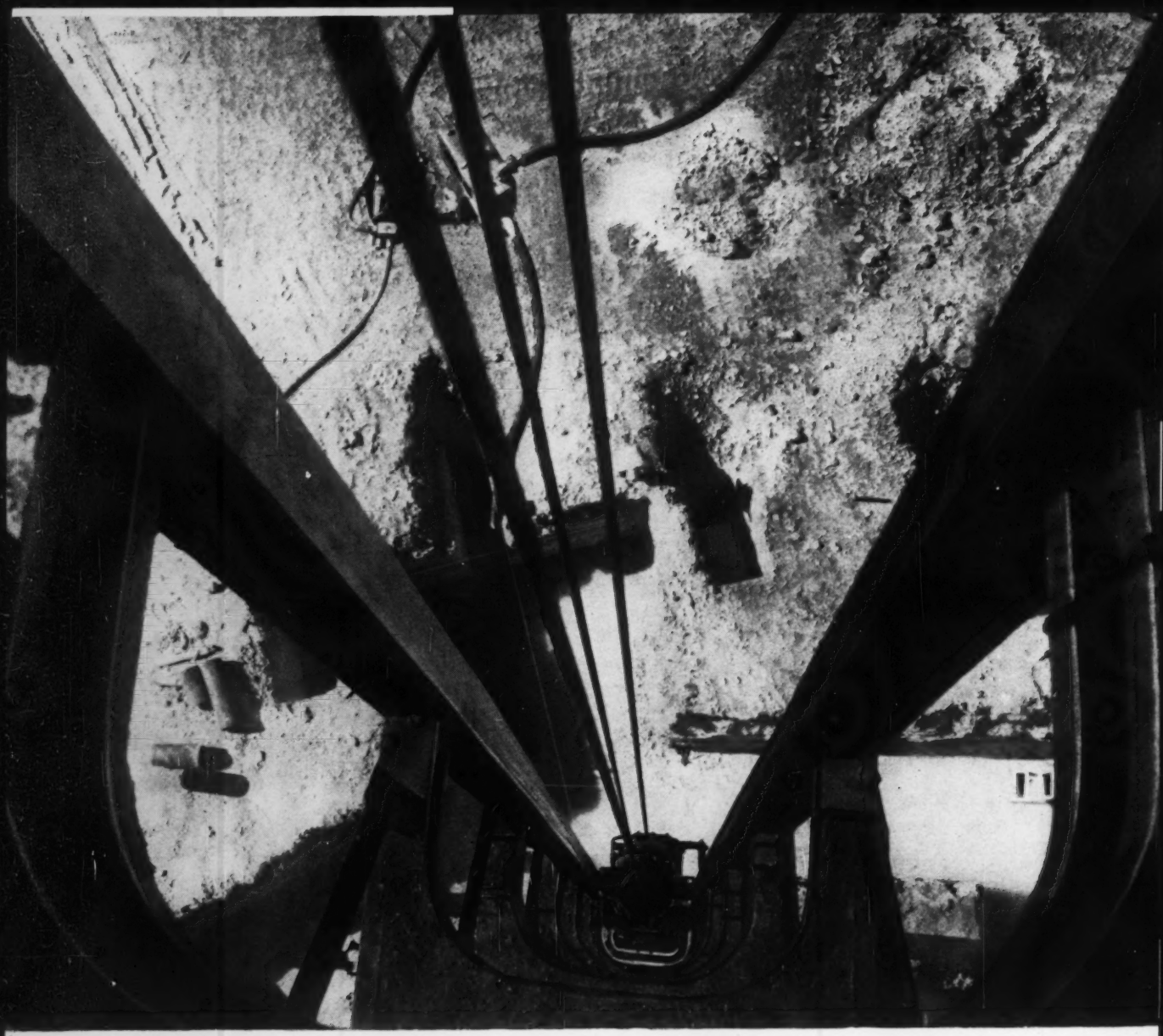

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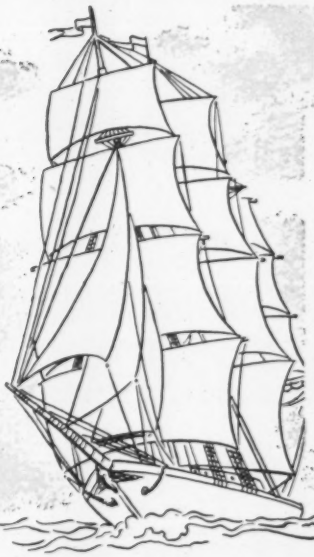

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ENGINEERING NEWS-RECORD

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THE CONSTRUCTION WEEK

TRAINS FOR GOLDEN GATE?—Directors of the Golden Gate Bridge and Highway District have reopened the door to rapid transit on the Golden Gate Bridge by voting 8-5 to bring in an independent engineering board of review to decide on feasibility. Earlier they voted 9-4 to accept unconditionally a report declaring the bridge incapable of supporting trains (ENR Sept. 14, p. 26).

STILL NOT READY—Don't look for any public announcement of the often predicted official findings of the Ottawa (Ill.) test road during the annual convention of the American Association of State Highway Officials in Denver next week. The Committee on Design now says it won't report until June 1962.

RUNNING MONEY INTO THE GROUND—A Boston investment house has put an even $1 million into the C. L. Guild Construction Co. of Providence, R. I. The investment is tied to Guild's current tests of a vibratory pile-driving device that is reported to have sunk a 90-ft pile in less than 10 seconds. The unit was invented by Albert C. Bodine of California, but Guild holds exclusive world rights to it.

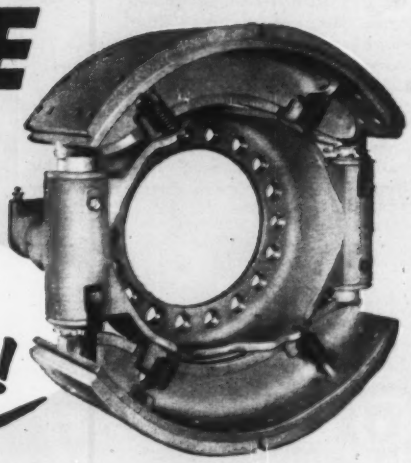
A WARNING FROM McCLELLAN—Citing violation of labor's no-strike pledge at Titan ICBM bases in Colorado last month (ENR Sept. 28, p. 61), Sen. John L. McClellan moved to supplement the pledge with a stringent law. He introduced, for consideration by the next session of Congress, a bill that would destroy the right to strike at all sites or plants engaged in designing, developing, producing, testing or launching munitions, weapons, missiles or space vehicles, or any essential component part. The bill would require compulsory arbitration.

UP FROM ANTIQUITY—Mayor Wagner last week ordered the first major revision in New York City's antiquated building code since 1938. The transition from a specification-type code to a performance-type code is expected to take three years.

GLUED COMPONENTS SET—The Federal Housing Authority has changed its attitude toward gluing. Now pressure-glued structural components can be used in FHA-financed houses. FHA set two conditions. An independent quality-control agency must stamp each fabricated component. Engineering calculations and drawings must comply with Douglas Fir Plywood Association standards and get FHA approval.

IF WE'RE STILL AROUND—Spending for fallout shelters will total $200 billion over the next 15 to 20 years, according to Frank F. Norton of Chicago, temporary president of the newly formed National Shelter Association.

It's here! New HEAVY-DUTY STOPMASTER BRAKE



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WASHINGTON OBSERVER

- **Transportation message will ask urban aid**
- **Proposed law would take pay out of payola**
- **Readability planned for Pentagon contracts**

- **The basis of President Kennedy's transportation message to Congress next January will be in the White House by November 1.** Commerce Secretary Luther Hodges is putting the finishing touches on his recommendations, based on a series of reports and studies by interested parties. Mr. Hodges —and subsequently Mr. Kennedy—is expected to call for federal aid to help cities solve urban transportation problems. It is uncertain whether the President will propose outright grants or low-interest, long-term loans.

  Also still unsettled is whether the transportation message will take up highway financing problems. The National Highway Users Conference urges Secretary Hodges to consider a number of proposals, including: federal-state action to eliminate delays in the Interstate Highway System because of local route disputes; a ban on state diversion of funds to non-highway uses; federal concentration on Interstate programs and not on urban problems; more equitable distribution of federal highway taxes between users and non-users.

—

- **A Blatnik subcommittee report blasting "payola" in the Florida highway program increases chances that Congress will outlaw such payments.** The subcommittee, accusing the Florida Highway Department of complacency, says it is "incomprehensible" that state officials failed to detect payments involving so many State Road Department personnel. Based on this and similar reports, Congress may enact a bill by Rep. William C. Cramer (R., Fla.) to make such payments, their offer or solicitation, unlawful.

—

- **The huge amount of red tape involved in defense procurement is the subject of a new Air Force-contractor study.** Involved are the major defense contractor trade associations—National Security Industrial Association, Electronics Industries Association and Aerospace Industries Association. The idea, of course, is to find ways to simplify and improve military buying, including award of construction contracts.

  One goal is to consolidate or remove the mass of "boiler plate" clauses in defense procurement and construction contracts. These set forth basic conditions for doing business with the government and cover such standard but legally complex questions as military security requirements, use of convict labor, preference for domestic commodities and reporting of royalties. One idea is to place such clauses in a pamphlet to be supplied to all contractors, then make a brief reference to them in specific contracts.

—

- **The Defense Department has shelved for the time being a proposal for "cost-plus-award-fee" contracts.** Under the plan, a military board of procurement would evaluate a contractor's performance and determine his profit allowance on the basis of performance. The contractor would still bid on a project, but if he did a good job, he'd be allowed a larger margin of profit; if bad, a smaller margin. The proposal is being held back pending a major study to establish a meaningful system to measure contractor performance. What the Pentagon wants to do is set firm criteria, if possible, to evaluate how well a contractor did his job.

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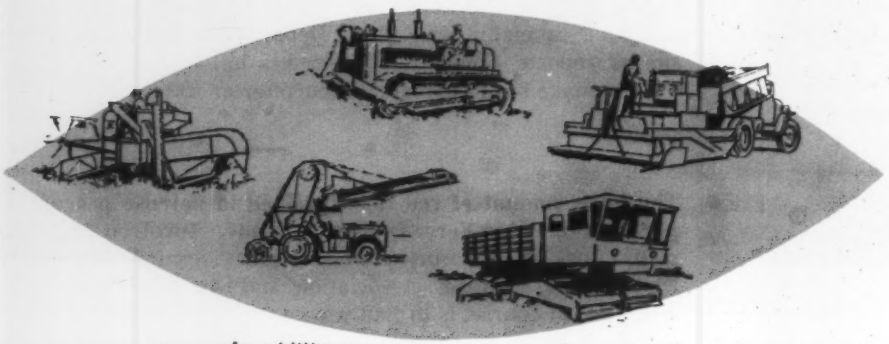

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Are U.S. $ Halting Pollution?

- **Five years and $1.7 billion later, even the skeptics are praising the federal government's water pollution program.**
- **The 87th Congress smiled on the program, appropriating $80 million this year for grants-in-aid for sewage treatment plants.**
- **ENR sees a boom ahead. Sewerage construction awards for first nine months of '61 are 29% ahead of last year.**

By William W. Jacobus, Jr.

With federal water pollution control an established fact of life and federal grants a factor in sewage treatment plant construction for five years, ENR took a look at the record of the five-year-old program and the outlook for it as newly expanded. Experts in government, industry and construction helped us throw some light on a number of questions:

Has the federal government anti-pollution campaign paid off? Are the nation's streams any cleaner? How much has it cost and who has paid? Who has benefited? What's in it for construction in the future? Here are some of the answers.

Construction is up 60%, although we haven't begun to dent the formidable backlog of needed sewage treatment plants. The U. S. Public Health Service says the increase in plant construction since the start of the grants-in-aid program has barely kept the nation abreast of the demand caused by obsolescence and population growth.

The failure to catch up was detailed in a recent survey by the Conference of State Sanitary Engineers showing that communities serving nearly 15 million people are discharging raw wastes to the nation's rivers and streams. Another 3 million people have no sewer systems at all. This need for sewage treatment facilities involves 3,420 separate communities.

PHS figures show that construction must be increased 40% to an average annual volume of $600 million to meet municipal sewage treatment needs by 1970.

Commenting on the hectic race against stream pollution, Gordon E. McCallum, chief of PHS's water supply and pollution control branch quotes the Red Queen from "Alice in Wonderland," saying, "It takes all the running one can do to stay in the same place."

Mr. McCallum says there has been progress, but sometimes it seems "glacially slow." For every new waste treatment plant built by a municipality, three new kinds of waste appear.

Nearly $1.7 billion worth of treatment plants have been started under the federal grant-in-aid program since 1956. The federal share of this is $295 million, or roughly 17%. Local governments spent the other $1.4 billion for treatment plants serving more than 27 million people.

Of the 2,746 communities that have been granted federal aid, 57% have completed their treatment facilities, 26% have them under construction, and the rest are designing them.

Congress marked the fifth anniversary of the federal grant program by beefing-up the law. With the wholehearted approval of the Kennedy Administration, the legislators last summer approved amendments that give the clean streams program more funds, more authority, and even some new areas of operation.

Spearhead of the federal stream clean-up is the program of incentive grants for construction of treatment facilities. This year's amendments authorize $80 million for construction grants during fiscal 1962, $90 million for fiscal '63, and $100 million per year through fiscal '67. Before adjourning, the 87th Congress also appropriated the grant funds for the first year.

Rep. John A. Blatnik (D., Minn.), a long-time booster of pollution abatement and sponsor of the 1956 bill establishing a grants program, said:

"Within the next seven or eight years the Water Pollution Control Act will have developed into an accepted program similar to the Rural Electrification Administration."

Sen. Robert S. Kerr (D., Okla.), representative Blatnik's pollution-conscious counterpart in the Senate, calls the amended legislation "a forward step in water resources development that should be rated with the 1936 and 1941 Flood Control acts."

The federal program is aimed at the small community. The idea behind this, according to PHS, is that the taxpayer in the smaller community faces a much higher financial investment in building and operating a waste treatment plant than does his counterpart in the large city.

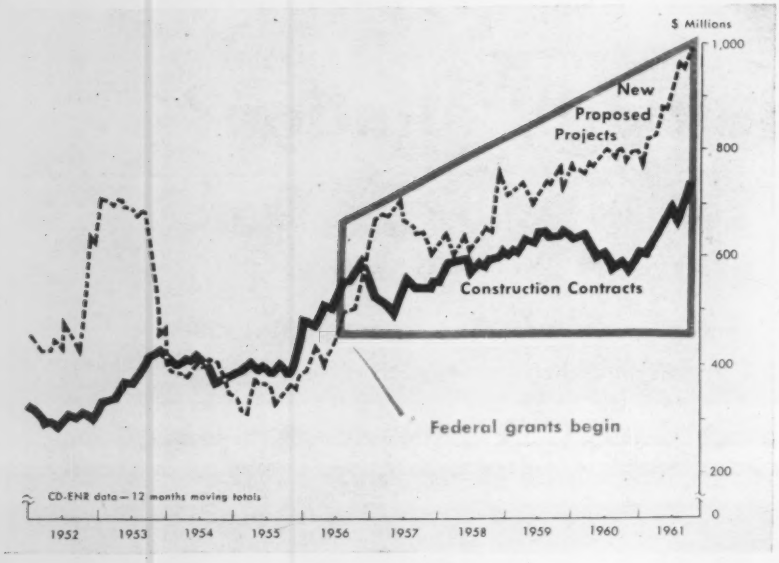
PHS figures show that per-capita cost of a typical sewage treatment plant in a town of 1,000 population is 3½ times the per-capita cost in a community of 100,000.

The individual state pollution agencies have the responsibility of distributing federal grants. The states determine which community is most deserving by considering the ability to pay, how much pollution the town is creating and other related facts.

Under this system of doling out grants, 87% of the communities that received grants in the last five years had populations of less than 50,000. Furthermore, these communities built 94%

*To write this article, **Assistant Editor Bill Jacobus**, whose field is water resources, went to those who conceive, execute, live under, boost and simply put up with the federal water pollution control program.*

. . . Sewerage construction plans and contract awards have climbed



of the projects. Cities of 50,000 and over received 13% of the federal aid and built only 6% of the projects.

PHS claims that, as a result of the federal program, cities of under 50,000 increased treatment works construction by 140%. Cities of 50,000 and over increased construction of treatment works by 9%.

Although the amended law still requires that 50% of the grants go to communities of 125,000 or under, the maximum grant has been hiked from $250,000 to $600,000, or 30% of the cost of construction, whichever is less. A maximum grant of $2.4 million is allowed for a project that serves more than one municipality.

These jacked-up grants, while possibly making the program more attractive to larger cities or joint sanitary agencies, may have a negative effect. The limited amount of grant funds might not get spread around quite as effectively.

However, the available money might abate more pollution. As Ray E. Lawrence, president (until next week) of the Water Pollution Control Federation and partner in Black & Veatch, Kansas City consulting engineers, says:

"If abatement of pollution is the sole objective, then more pollution can be abated per dollar of investment in the larger population centers than in the smaller communities."

The National Association of Manufacturers, long-time opponent of the federal grants-in-aid program, still condemns the system because "it rewards the communities which have been most laggard in meeting their obligations. It is unfair to those communities who constructed treatment plants solely with their own funds . . ."

But the consensus among water pollution experts queried by ENR is summed-up by Samuel I. Zack, vice-president of Gannett Fleming Corddry and Carpenter, Harrisburg engineers:

"The program has been fair and equitable and the grants-in-aid allocations handled in a most business-like manner, quite unlike the bureaucratic administration of other governmental agencies.

"The act has made sewage treatment possible for smaller communities of 1,000 to 5,000 population. It has materially reduced revenue required for financing these smaller sewage projects."

ENR data show a strong uptrend in sewerage construction since federal aid became available (table above). Both proposed projects and construction contract awards have edged steadily upward since 1956.

Although ENR figures reflect total sewerage construction, not just treatment works the trend is apparent. A decided spurt in proposed work accompanied the original legislation five years ago and, similarly perhaps, there was an upsurge in planning during late 1960 and early '61, just prior to the new amendments.

Contract awards don't reflect the same sharp variation as the proposed work since they're not generally made in lumps. Note the steep rise in the early '50s caused mainly by the $100-million Allegheny County Sewerage Authority project in Pittsburgh. Contract awards for this job began in January of 1956 producing a peak, but not as pronounced as when it was proposed.

But the trend is up. ENR figures signal the start of a boom in sewerage construction. Last month's contract award rate was the third highest on record. The first nine months of this year set a record at $571 million, 29% more than volume in the same period last year.

Moreover, ENR forecasts an 8% rise in dollar value of awards for 1962. As fast as sewerage projects move out of the planning stage and into construction contract status, other projects are hitting the drawing boards in much greater volume.

During the 12 months ending September 30, sewerage contracts totaled $870 million, the greatest 12-month figure ever reported by ENR. In this same period nearly $1 billion in new sewerage projects were proposed. This boosted ENR's backlog of proposed sewerage construction to an all-time high of $4.3 billion, 9% higher than only 12 months ago.

The need for new sewerage construction is also reflected in the magnitude of borrowing for this purpose by state and local governments. Bond sales explicitly for sewerage construction hit a record $411 million in the first nine months of this year. This is 38% above last year and very close to the average 12-month volume for recent years.

The Public Health Service, working with pollution control agencies from all 50 states, reports enthusiastic state support of the federal program. State agencies that deal directly with the municipalities say the grants-in-aid are a strong incentive and that many of the nearly 3,000 cities that received aid would not have been able to go it alone.

Figures in the PHS report show average annual expenditures for waste treatment works construction, including contract awards and other project costs, for the years 1952-56 at $270 million. The 1957-1960 average annual outlay was $430 million.

The need for sewage treatment works is real. And even the harshest critic of the federal program does not contest this point.

But there are still the Doubting Thomases regarding the federal program. Richard W. Smith, manager of the U.S. Chamber of Commerce's natural resources department, has this to say:

"The federal grants-in-aid have reduced construction of sewerage facilities. This year's grant-in-aid increase will give funds to some who have been waiting for the federal handout, but it will induce still others to wait for their turn instead of going ahead on their own."

The program will continue to expand, Mr. Smith believes. "The history of

with federal aid

federal intervention and grants-in-aid is, that, once started, they always grow," he said. "The public never kills Santa Claus, even though federal grants cost the taxpayers more financially and in loss of freedom than if they solved their problems on their own."

The National Association of Manufacturers says: "Municipal expenditures for waste treatment plants were on the rise prior to the first grants in 1956. Since then, subsidized construction has tended to displace unsubsidized construction.

"Total annual construction remains at about the same level and the only reason the total does not drop is because of the persistence of unsubsidized construction. The enlargement of the program will only serve to further displace unsubsidized construction."

This year's amendment broadened the enforcement powers in the law. Federal pollution abatement now is extended to cover pollution of navigable as well as interstate waters.

Since the federal government first entered the pollution control picture under a 1948 act, 15 enforcement actions have been taken, all but one after 1956. And only one, against St. Joseph, Mo., reached the final stage of the proceeding. The case was turned over to the Justice Department, but failed to reach the courts before the reluctant citizenry finally okayed a bond issue on the third go'round (ENR Apr. 20, p. 21).

The latest actions are over New Jersey's Raritan Bay and the North Platte River in Nebraska and Wyoming.

Has experience in the last five years proved the need for federal enforcement in water pollution control? David B. Lee, director of the Florida State Board of Health says, ". . . the need of federal enforcement in water pollution control is demonstrated by the fact that many towns that can finance treatment works don't."

Mr. Zack has mixed feelings: ". . . elimination of pollution is just as much a national problem as state highways. The health of people in New York is of concern to people in Chicago and Los Angeles. Taxpayers refuse to support financing because they are not convinced of the need . . . . I do not subscribe to the premise that there are municipalities in the U. S. that cannot afford sewage treatment if they want it."

Karl M. Mason, director of Pennsylvania's Bureau of Environmental Health, feels, ". . . federal enforcement actions in certain interstate situations are necessary and desirable."

One of the 1961 amendments to the act may have an unexpected favorable effect on the distribution and size of dams built in the future. It requires the Corps of Engineers, Bureau of Reclamation, or other federal agency to consider storage for stream flow regulation in its plans for a reservoir.

The amendment emphasizes that this storage is for water quality control and is not a substitute for adequate waste treatment.

Senator Kerr considers this the most important amendment of all because of its effect on water quality. The Senator says, "Already many cities are using water fourth and fifth hand and as demands mount for more and more water, we'll need to pay stricter attention to the quality as well as quantity."

In total, then, the record shows—the outlook promises—effective expenditures of federal money on sewage works.

House Barricades the 'Back Door'

The issue of back-door spending will be high on the agenda of the Congress that comes back to town next January. And it's important to a wide variety of government construction programs.

This became clear as the last act of the first session of the Congress was a victory for the House over the Senate on this issue. The House succeeded in sneaking into legislation appropriations for key programs that otherwise would be financed through Treasury borrowing. This gives the appropriations committees and Congress an opportunity each year to cut back on the details of each year's spending programs.

President Kennedy won a partial victory that allows him to commit $7.2 billion for long-term, foreign-aid development loans over a five-year period, but Congress kept the purse strings. Appropriations for each year's spending must still go through the congressional mill.

For the current fiscal year, which began July 1, the outcome of the dragged-out House-Senate wrangle gave the President $3.9 billion for all foreign aid programs, about $1 billion less than he had asked.

On the public works appropriation bill, Congress approved 64 new construction starts for the Army Engineers, and six for the Bureau of Reclamation. The total appropriation for all public works was $3.9 billion, slightly less than last year, and slightly less than Mr. Kennedy asked.

The big fight was over the Upper Colorado transmission lines; funds to start work on federal lines estimated to cost $187 million were approved.

Congress did not approve money for an 800,000-kw generating plant to be installed at the Hanford, Wash., plutonium plant—the other big public-private power fight of the session.

In the political fuss over Treasury borrowing or direct appropriations, programs on area redevelopment, public housing, housing demonstration, open space purchases and mass transit were trimmed.

Actually there is still a legal question whether the Administration has the authority to use the larger Treasury borrowing authorized earlier, or whether it is politically wise to do so, if it decides it has the authority.

The supplemental appropriations bill sent to President Kennedy now provides:

- Mass transit—The earlier bill provided through Treasury borrowing $50 million in loans, and $25 million in grants. The last-minute measure appropriated $30 million for loans, and $35 million for grants.
- Open space—Borrowing was authorized up to $50 million for grants; the appropriation bill cuts this to $35 million.
- Low-income demonstration housing—Borrowing was authorized for $5 million, but the appropriation was only $2 million.
- Public housing—The Administration had asked $350,000 additional for the increased administrative burden of processing a public housing program geared to the 100,000 units that Congress authorized in the housing bill. For years, the public housing workload was geared to the 35,000 units authorized each year. The supplemental appropriation refused the additional $350,000.
- Area redevelopment—The supplemental bill provided $122.5 million in appropriations for loans—the same amount authorized under borrowing from the Treasury for this fiscal year—and directed that no administrative funds could be used to process more than this amount of loans. The $40 million of area redevelopment grants was not affected; the original bill required that this money be from appropriated funds, not borrowing.

If the decision on these programs is to abide by the legislation in the appropriations bill, most of these programs will go forward, although at slower speeds and at lower levels.

But in the last analysis it will be up to Mr. Kennedy to decide what the Administration strategy will be, in view of the hotter fight over back-door spending that's now assured next year.

Engineers at the Industrial Building Congress hear . . .

Prestressed Steel Offers Designers

Architects and engineers will do well to add prestressed steel to their tool kit of ways to make steel work harder and harder per pound of weight and per dollar of fabricating cost.

The Second Industrial Building Exposition and Congress in New York City heard this advice last week from T. R. Higgins, director of engineering and research, American Institute of Steel Construction. About 2,800 architects, engineers and industrial executives attended.

"Prestressed steel," Mr. Higgins said, "usually consists of high-tensile steel tensioned against an ordinary carbon-steel beam, girder or truss to develop a stronger and more efficient structure. Since steel requires less bracing in tension than in compression, a few highly tensioned bars or cables can be made to take much of the weight, and thus double the load capacity and improve rigidity."

The principle was applied to steel structures long before availability of high-strength steel made prestressed concrete possible, Mr. Higgins contended. Bridges with a wrought-iron truss rod underneath each main girder were a familiar sight at the turn of the century. The truss rod, when tightened with a turnbuckle, not only induced negative bending moment in the girder to relieve its dead load, but also participated directly in the live-load stress by acting as the bottom chord of a truss.

Mr. Higgins cited several recent applications of prestressing to steel structures:

- A steel I-beam bridge in Iowa strengthened by tensioned rods along the bottom flanges. (In another Iowa bridge, addition of high-strength cover plates in the fabricating shop, while girders were flexed, provided prestressing. ENR will publish an article on this bridge in an early issue.)
- The United Air Lines hangar at O'Hare International Airport, Chicago, with cantilever trusses prestressed with rods along the top chord. (Steel was cut from 6.35 to 5.29 lb per sq ft—ENR Sept. 17, 1959, p. 67).
- The circular roof of the Pan American passenger terminal at New York International Airport with cantilever girders suspended from tensioned cables (ENR Mar. 5, 1959, p. 30).
- The addition to the Port of New York Authority bus terminal in New York City with tendons along the bottom chord of 200-ft trusses; steel per truss was reduced from 300 to 240 tons (ENR July 13, p. 32).

Mr. Higgins spoke in a session on development in construction methods and materials, one of 19 sessions held by the Congress. The other sessions dealt with a wide variety of topics, such as plant location, contract evaluation, leaseback financing, cost estimating, and current practices in heating, ventilating and cooling. Most of the sessions were aimed at helping plant engineers and owners who build infrequently. About 60 exhibits of materials and services for industrial buildings supplemented the Congress.

An IBM official pointed out the usefulness of the critical-path method of scheduling construction (ENR Jan. 26, p. 25) in a Congress session on developing more effective construction procedures. Nathaniel M. Martin, director of facilities planning and construction, International Business Machines Corp., New York City, explained the advantages of the new technique over conventional bar-chart scheduling in expediting construction. Chief advantage of the critical-path method is that it shows the dependence of each stage of construction on the others, he said.

Walter M. Carlson, senior computer engineer, E. I. du Pont de Nemours & Co., described the development of an information retrieval program for use with high-speed electronic computers.

"An outstanding factor in the cost of designing any facility is the expense of capturing the information, data and experience available from previous design efforts," he said. "To do his job, the design engineer must have an in-

For future exurbs on the Patuxent . . .

Maryland Maps Master Plan

A new, long-term master sewerage plan for Maryland's Patuxent River Basin calls for $124 million of construction spending over the next 40 years.

Major facilities recommended include five sewage treatment plants costing $24 million and principal interceptors and pumping stations costing $19.4 million. Lesser interceptors and laterals would cost an additional $80 million.

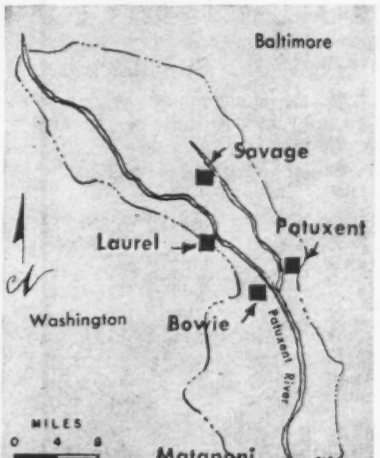
Works will be financed and built in stages by the counties involved, with the help of federal and state grants. Under Maryland's matching grant program, the state matches the federal contribution. The two governments together will foot half the cost of major works, assuming the present grants system continues throughout the construction period.

The plan incorporates work already under way or completed on three of the treatment plants: Laurel, Bowie and Patuxent.

Additional state aid would be required to carry out a recommendation calling for state acquisition of strips bordering the river. This would permit tighter control over sedimentation and other forms of pollution resulting from cultivation, land clearing, grading, quarrying and refuse dumping.

Underlying the plan is the Patuxent Basin's expectation of a five-fold increase in population by the year 2000 because of suburban expansion of the Baltimore and Washington metropolitan areas.

Preliminary impetus for making the study came from the Baltimore Regional Planning Council.



PATUXENT RIVER BASIN will get five sewage plants under 40-year plan.

The study was financed jointly by the Maryland State Health Department, Anne Arundel County, Howard County, Prince Georges County and Fort George G. Meade as major contributors; and the City of Baltimore, Baltimore County, District of Columbia and Washington Suburban Sanitary Commission as secondary contributors.

The consulting board for the study is made up of Abel Wolman and John C. Geyer, of Johns Hopkins University,

a New Tool

expensive, readily available procedure for getting basic data from current research and development, and he must tie this together with an accurate, complete record of past experience."

So, du Pont has set up an Engineering Information Center. An engineer forwards questions to an information specialist, who lists the key words in each question. Then, for each of these words, he lists synonyms that have been used in the past. These words are sent through a machine that determines from information previously stored whether any previous work has been reported on the subject, and if any has been done, the machine prints the appropriate references. Finally, the information specialist gets the documents and passes them to the engineer.

for Sewerage

and Benjamin E. Beavin, of Baltimore.

All five sewage plants would eventually render both primary and secondary treatment. They would have a combined ultimate capacity of 59.5 million gal a day and would serve a population of 541,000. Individual plant capacities and costs, including pumping stations and major interceptors are estimated as follows:

Plant	Capacity (mgd)	Cost ($millions)
Savage	13.4	14.4
Laurel	4.2	2.2
Bowie	10.8	3.7
Patuxent	5.3	9.7
Western Branch	25.8	22.1

A staging plan divides construction of each plant into three or four increments about 10 years apart. The engineers noted that interceptors might also have to be built incrementally as parallel lines because of the high cost of building single lines to full ultimate size at the outset.

The engineers recommended future consideration of a Chesapeake Bay outfall for the Patuxent Basin. They found that a single treatment plant and interceptor discharging to the bay at present (in conjunction with another Potomac region system) would compare favorably in cost with the five-plant arrangement; but it would not adapt readily to stage construction, would be hard to finance and would be hard to coordinate with Washington area participants.

$46-million Center City project sparks private, public jobs as . . .

Building Booms in San Diego

San Diego's $46-million Center City project, already in its initial construction stage, rolls into higher gear following appointment of a five-man advisory board and a consulting architect by the city manager.

Accompanying the big public building program is a private building boom; $42 million worth of construction is either planned or under way for the downtown area.

The Center City Advisory Board will study architectural requirements, interview architects, and study the planning and over-all methods of financing construction. City Council, after hearing the board's recommendations, will name architects for proposed buildings and make final determination of financing methods.

Appointed consulting architect at annual fee of $125,000 is Samuel Wood Hamill of San Diego. He will prepare preliminary drawings of major buildings in the Center City project and work with the City Planning Commission and the five businessmen appointed to the advisory board. Mr. Hamill's job is expected to last about two years.

The Center City master plan, unveiled last winter by the City Planning Commission, should serve city government needs until the year 2020. The project will comprise 10 buildings planned for a 1,200-acre downtown area also occupied by commercial buildings. Project success was assured last spring when the City Council voted unanimously to purchase key downtown building sites.

Construction has already started on two government buildings: a $10-million county courthouse building and a $6-million state office building. The courthouse building comprises a courthouse, a seven-story building and a three-story jail wing.

Among the eight proposed buildings not yet under construction:

- A $4.4-million, 22-story City Hall.
- An $11-million police department headquarters and jail.
- A $2.8-million convention hall seating 5,800 persons.
- A $3-million, six-story parking structure.
- A $3.5-million courthouse annex.

Outstanding among private projects is a $5.5-million, 24-story office building, under way last April.

Major projects planned include the 21-story U. S. Grant Hotel, estimated at $6.4 million, and an 18-story addition for the Home Federal Savings and Loan, estimated at $4.5 million.

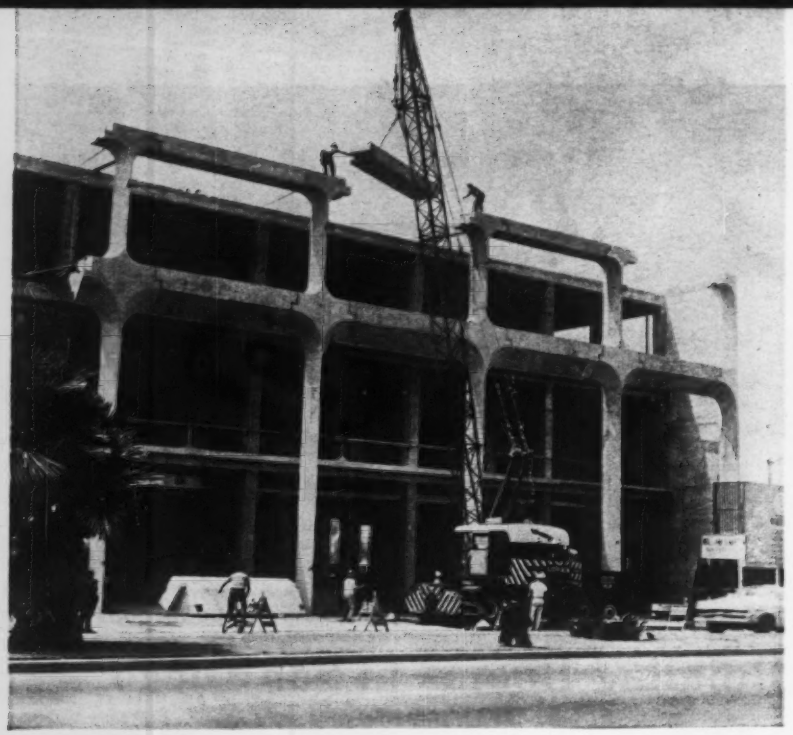
Big Underground Garage May Double as Shelter

The owners of Boston's mammoth underground parking garage plan to adapt it for use as a fallout shelter.

The Massachusetts Parking Authority has proposed to the Office of Civil Defense a plan to convert the garage to accommodate 25,000 persons in time of atomic attack. Extensive remodeling is necessary to provide a ventilation system effective against radioactive dust.

The garage will open in November. Since work began in March, 1960, more than 45,000 cu yd of concrete have been cast. Three-level parking will provide space for 1,500 cars on 13 acres of floor. The capacity may be doubled to 3,000 cars in the future.

The authority financed the garage under a $9.6-million bond issue.



Far East Style Out West

Sculptured concrete will help give a distinct Oriental appearance to a Japanese department store under construction in Los Angeles. It will be achieved by erecting white, precast, prestressed concrete beams and columns in front of a wall of glass, mosaic tile, and shoji screenlike windows.

One-piece 60-ft columns rise from street level to roof. Beams at third-floor and roof level, sit on haunched brackets cast monolithically with the column. Rigid connections are made by welding steel inserts at the haunches. The eight columns, connected by 14 beams, will stand in four reflecting pools.

The Seibu department store was designed by Welton Becket and Associates, architects and engineers of Los Angeles. Simpson Construction Ltd. is the general contractor.

Snow Forces Fast Dam Site Sight

Contractors who want to bid on the $6-million Blue Ridge water supply project in northern Arizona must inspect the site before it is snowed in this winter. Snow often covers the area by early November.

The unusual prequalification procedure was announced last week by Leeds, Hill and Jewett, Inc., consulting engineers for Phelps-Dodge Copper Corp., owners of the project.

Present plans call for bid opening about the first of the year, to give the successful bidder time to complete the project during the 1962 construction season. The site is inaccessible in the winter months. And the engineers are convinced that only contractors who have been over the ground will be capable of doing the work on schedule.

The Blue Bridge project is located about 50 miles southwest of Winslow, Arizona. It centers on Blue Ridge Dam, which will store water on East Clear Creek, a tributary of the Little Colorado River. The water will be pumped southward over Mongollon Rim, a lift of about 600 ft, into the Salt River Basin, replacing similar diversions made from the Black River for use by Phelps-Dodge at its Monrenci, Ariz., copper plant.

The dam will be a 160-ft-high concrete arch containing some 30,000 cu yd. Leeds, Hill and Jewett designed it by a deflection method using an electric analog computer analysis.

The project also includes a 3,000-hp pumping plant, about 12 miles of pressure pipeline and penstock and a 4,000-hp hydroelectric plant. The pressure pipe will be 33-in. steel cylinder concrete pipe.

Contractors can get further information from either the Los Angeles or San Francisco office of Leeds, Hill and Jewett, Inc. The firm will have a representative at Pine, Ariz., the nearest town to the site, to conduct prospective bidders to the job site.

Cambodian Road

Report demands probe of U. S.-built road failure

The House Government Operations Committee charges that a U.S.-built highway in Cambodia, intended to be a showcase of American know-how, was "so badly bungled that it has damaged our prestige, burdened us with costly repairs and supplied the Communists with an effective source of anti-American propaganda."

The committee demanded that the State Department fix responsibility for the road failure without delay and refer the matter to the Justice Department if findings warrant. In so doing, it confirmed an earlier subcommittee report (ENR June 29, p. 20).

The 132-mile highway was designed by the engineering firm of Michael Baker, Jr., Inc., Rochester, Pa. The contractor was A. L. Dougherty Overseas, Inc., Hammond, Ind. The project was financed and supervised by the International Cooperation Administration.

The road was completed in May 1959, almost a year behind schedule, and began to deteriorate soon thereafter. The committee said more than one-third of the highway will require major repairs or rebuilding. The project originally was estimated to cost $15 million; to date, it has cost more than $34 million and the final cost has not yet been fixed.

The committee said preliminary investigation shows that the most serious failures have occurred in a stretch of the road where a mixture of natural laterite, 5% sand and 10% crushed stone, was substituted for crushed stone base material called for in the specifications. Baker formulated and recommended the mixture. ICA officials in Cambodia and the Cambodian government approved its use as a "calculated risk to save time and money."

But the committee says there are indications that:

- The Dougherty firm failed to mix the stabilized base in accordance with Baker's instructions.
- Baker failed to make inspections and tests necessary to insure proper formulation and application of the mix.
- ICA representatives in Cambodia failed to require up-to-date reports from the engineering firm from which they could determine whether the road was being built according to specifications. ICA in Washington was not informed of the use of the stabilized mixture in place of crushed stone.

The committee emphasized, however, that engineering and investigative reports to date are not sufficiently complete to pinpoint responsibility for the road failure.

Variable Pressure System Sweetens Laboratory Air

An unusual air-conditioning system, featuring varying pressures to induce proper air flow, marks Koppers Company's new research center at Monroeville, Pa., opened last month.

The many types of research planned for the center—including plastics, coal-tar products and chemical desalinization of seawater—posed a tough air-conditioning problem. To prevent concentration of noxious fumes, the mechanical engineer designed the variable-pressure system.

Positive atmospheric pressures exhaust air from the offices, which line one side of each laboratory wing. Negative pressure in the laboratories brings air in from the corridors, thus inducing proper air flow throughout each laboratory wing.

High-velocity air distribution keeps ductwork at manageable size in the laboratory and main building areas. Low-pressure diffuser units supply air for fan lofts and other less important areas.

Designed for future expansion, the center comprises four major buildings connected by multistory, glass-enclosed passageways. A four-story administration building framed in reinforced concrete, includes executive offices, auditorium and conference room, and cafeteria. Three steel-framed laboratory wings, three stories high, project out from the central passageway.

Total cost of land, construction and equipment is estimated between $8 and $9 million.

Architects-engineers are Voorhees, Walker, Smith, Smith & Haines of New York City. Navarro Corp. of Pittsburgh is general contractor.

Three Intersecting Domes Roof Hexagonal Terminal

A hexagonal building, with three vaulted concrete roof segments, will house passenger facilities at Las Vegas's new air terminal. Now under construction, the $45-million terminal is scheduled for completion in August, 1962.

Each vaulted roof segment describes an arc rising 40 ft from the ground. The three thin shells are cast in place. The contractor plans to use the same form three times. A raised spine will join the shells at their intersection.

From two of the spines, ramps lead to the loading fingers. The third connects to the 550 x 90-ft steel-framed ticketing building. A two-story-high passenger concourse overlooks the loading area.

Welton Becket and Associates, of Los Angeles are the architects-egineers. The general contractor is Lembke Construction Co. of Las Vegas.

Around the World . . .

• **Kemano repair**—Kemano Tunnel is back in operation at the Kitimat, B. C., plant of the Aluminum Co. of Canada following a three-month shutdown for repairs costing $2 million. After watching hydraulic efficiency drop for several years, Alcan dewatered the 10-mile-long 25-ft horseshoe in June and found rockfalls as had been suspected (ENR July 20, p. 23).

• **Breaking the 1,000,000 kw barrier**—Consolidated Edison Co. of New York, Inc., has ordered the first steam turbine generator unit with capability exceeding 1,000,000 kw. Allis-Chalmers Co. will construct it to go alongside Con Ed's East River Station on Manhattan. The entire plant, scheduled to go on the line in early 1966, will cost $131 million.

• **Three dams proposed**—Three dams on the Sespe Creek, costing a total of $39 million, have been proposed by the United Water Conservation District of Ventura County, Calif. They are to insure future water supplies to the towns of Santa Paula, Fillmore and Oxnard.

• **Civil service for civils**—Governor David L. Lawrence of Pennsylvania has signed into law a measure that places all engineering and other professional employees of the state's Department of Highways under civil service.

• **Largest prestressed tank**—Contract to prestress a 28-million-gal concrete reservoir in Alderwood Manor, Wash., has gone to Preload Co., Inc., of New York City. The 370-ft-dia tank will have nearly twice the capacity of the second largest, in Springfield, Mass. Rasmussen & B-E-C-K, Seattle, are the general contractors; Gray & Osborne, Seattle are the consulting engineers.

• **Slip-lift method**—Builders are using slip forms and lift-slabs on the same project to erect a 10-story, $1.5-million apartment house in Nashville. The only other reported "combination" case is another apartment project located in San Francisco (ENR Oct. 29, 1959, p. 29.) Utility core slip forming is now under way; slab lifting is expected to begin in October.

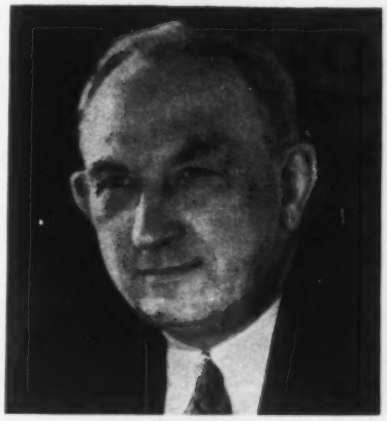
Noted Railroad Engineer Dies

Richard E. Dougherty, retired engineering vice-president of the New York Central Railroad, died September 29 following a brief illness. He had been a consulting engineer in New York City, with the firm of Seelye, Stevenson, Value & Knecht, since leaving the railroad about 10 years ago, after 46 years of continuous service.

Mr. Dougherty was president of the American Society of Civil Engineers in 1948, and throughout his life was active in its affairs as well as those of other technical societies, particularly the American Railway Engineering Association. He was also president of the board of education in his home town, White Plains, N. Y., for 12 years.

Mr. Dougherty, a civil engineering graduate of Columbia University, started with the New York Central as a rodman in 1902. By 1905 he had charge of construction in the line's Eastern District. From 1926 to 1930 he was engineering assistant to the president, and in 1930 was named vice-president for development.

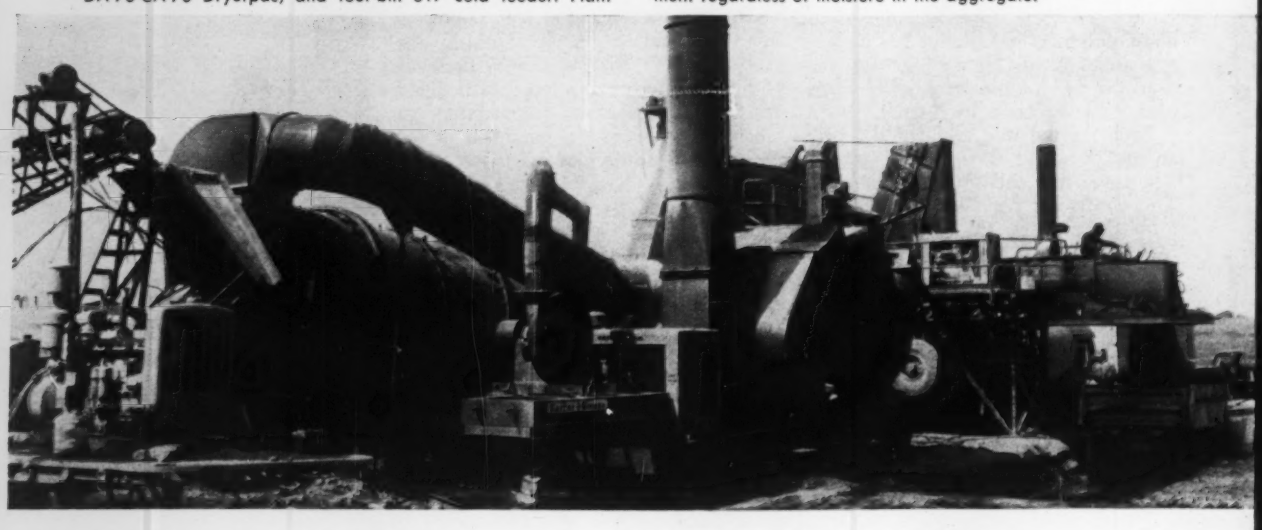
During his career with the railroad, his largest and best known job was the elimination of all of the railroad's grade crossings along New York City's Hudson River waterfront, which permitted the construction of the West Side elevated highway. The railroad's pier and wharf construction as well as its real estate operations in the Grand Central Terminal area were other facets of Mr. Dougherty's responsibilities. The outside engineering activity in which he took most pride was as President Truman's representative in planning renovation of the White House.

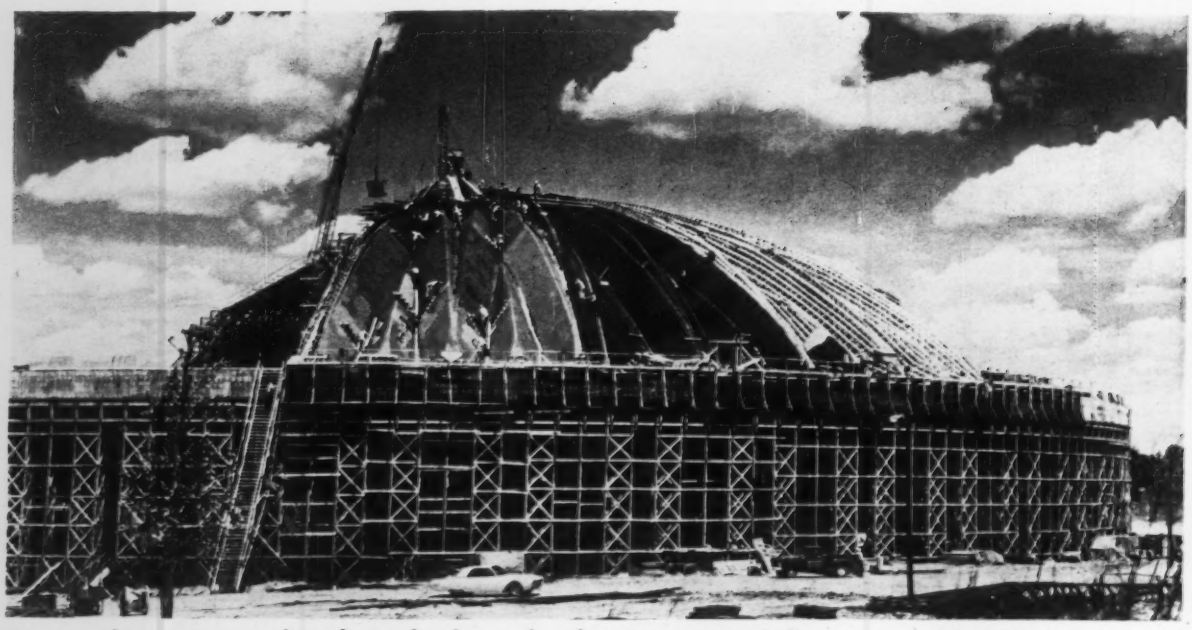


Richard E. Dougherty

STEADY PERFORMER. Lee & Johnson's new SA-40 averaged better than 200 tph for first 11 weeks operation with no downtime. Machine features joystick power-assist steering, hydraulically self-dumping hopper, heavy-duty longer life screed with improved automatic leveling and twin screed heaters, automatic feeder control, oscillating push rollers for on-the-fly pick up of trucks, and perimeter access for fastest, easiest servicing.

PROFITABLE PAVING PACKAGE. Lee & Johnson's Barber-Greene paving package is rounded out by this big 848-A Continuous Mix plant consisting of an 868 gradation unit, DA-70-CA-70 Dryerpac, and four-bin 817 cold feeder. Plant was torn down in 10 hours and was back producing two days after making first move. Plant Foreman Gerald Tenney states: "With this new Dryerpac we meet any high production requirement regardless of moisture in the aggregate."





Cranes place concrete directly in the forms for the University of Illinois assembly-hall dome.

Deft Concreting Speeds Work on

Concreting a big dome calls for a long high reach, so the contractor casting the 400-ft-dia roof of the University of Illinois assembly hall at Champaign uses two tall cranes.

Both cranes mount 100-ft booms and 50-ft jibs. One operates around the outside of the structure. The other works on the inside.

The domed roof springs from a post-tensioned ring 42 ft above ground level (ENR June 1, p. 32). It arches to 104 ft above grade at its center. Forty-eight massive concrete buttresses support the post-tensioned concrete ring.

The roof, which is a folded-plate design, is being cast in twenty-four 15-deg segments. The first segment was successfully cast in 12½ hours on June 23. Subsequent segments were concreted in less than 10 hr as the crew became more experienced.

• **Concreting methods**—In planning the job, Ray C. Dickerson, president of Felmley-Dickerson Co., general contractor, considered various methods of placing the concrete in the forms. These included hoisting concrete for the outer, lower areas of the roof directly into place with a tall crane. Concrete for the upper or central areas could be hoisted by an existing materials elevator and wheelbarrowed into place. Concrete for those areas that couldn't be reached by the crane or were too steep for wheelbarrow operation could be sent up in the materials elevator and forced into place through an 8-in. aluminum pipe under compressed air.

Felmley-Dickerson decided finally to place the concrete for the entire roof

As soon as ironworkers finish positioning the reinforcing steel . . .

Crane swings concrete bucket over

EVERYTHING A-OK AS NEW SA-40 PAVES 90,000 TONS OF MIX IN JUST 11 WEEKS

"Our new Barber-Greene gives us high capacity performance with operating ease, precision control and is a cinch to maintain," says Lee & Johnson superintendent

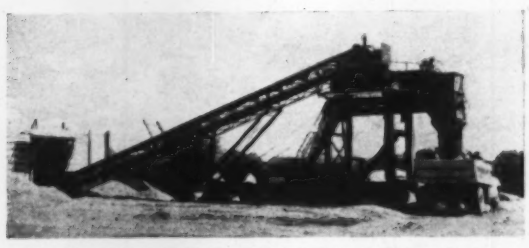
Lee & Johnson, Inc., Sioux City, Ia., asphalt paving contractors, wasted no time getting the low down on their new Barber-Greene SA-40 Finisher.

Superintendent Roy Hankins puts it this way: "We just hit the starter and turned her loose on three state and county jobs totalling 41 miles. In 11 weeks our SA-40 has put down over 90,000 tons of mix, consistently averaged over 200 tph, more than 2,000 tons per day with one peak of 2,738 tons. She was working under speed restrictions, too, most of the time since speed on state work is limited to 45 fpm. And we know this baby can pave at 100 fpm because she made seven haul trucks disappear like magic one day when we went out to beat an oncoming rain storm.

"Furthermore," adds Supt. Hankins, "The SA-40 easily pushed the largest trucks up the 7% grades on these jobs and smoothly paved the curves. And the machine's automatic leveling ability meant we easily satisfied the ⅛" in 10' state surface deviation requirement.

"When we bought our new 200 tph Barber-Greene 848-A plant," he concludes, "We wondered if the SA-40 could keep pace. It has and it could easily handle even more mix. It's easy to operate, gives precise control, and that perimeter servicing makes it the simplest and fastest finisher to maintain. It's the ideal machine for our high-capacity paving operations."

Let your Barber Greene Distributor show you why the SA-40 has become the nation's best selling finisher in its first season. You'll like the price, too, for it includes features you pay hundreds of dollars extra for on other finishers.



STABILIZATION PLANTS FOR EVERY NEED. Self-erecting Model 828 shown produces stabilized base mix from 200 to over 600 tph.

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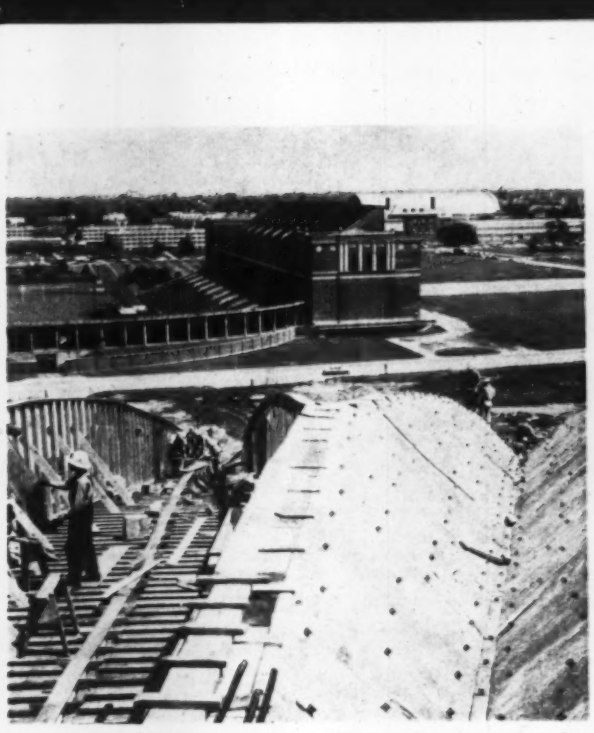
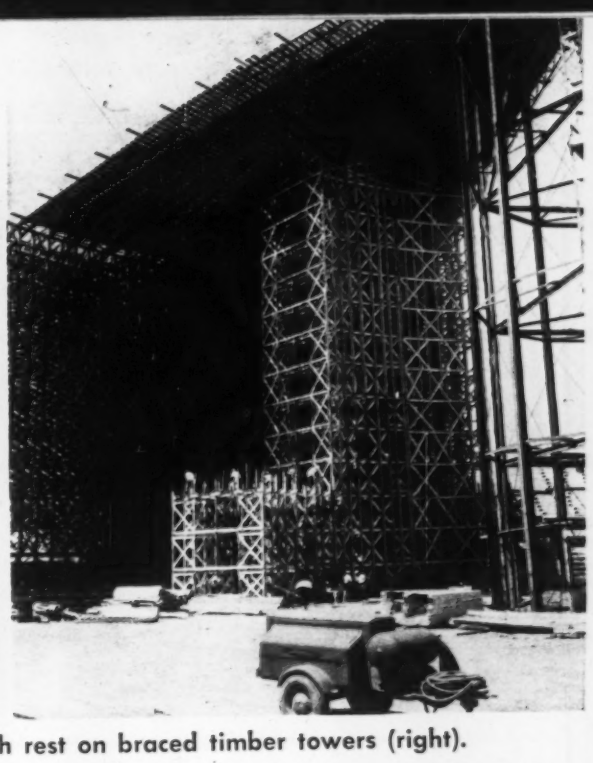




Carpenters (left) precisely shape the forms, which rest on braced timber towers (right).

Huge Dome

with cranes. The materials elevator serves as a standby.

Each 15-deg segment of roof contains about 120 cu yd of lightweight concrete. It is 52 ft wide at the junction with the post-tensioned ring and 6.5 ft wide where it joins a heavily reinforced concrete ring on top of a temporary steel tower.

This tower, with its materials elevator, and the concrete ring at the base of the dome were completed in the early stages of construction. The tower-and-ring will support the roof at its center until the post-tensioning is completed next spring. At that time, the stresses in the post-tensioned ring are expected to lift the center of the roof 3 in. off the steel tower, permitting its removal.

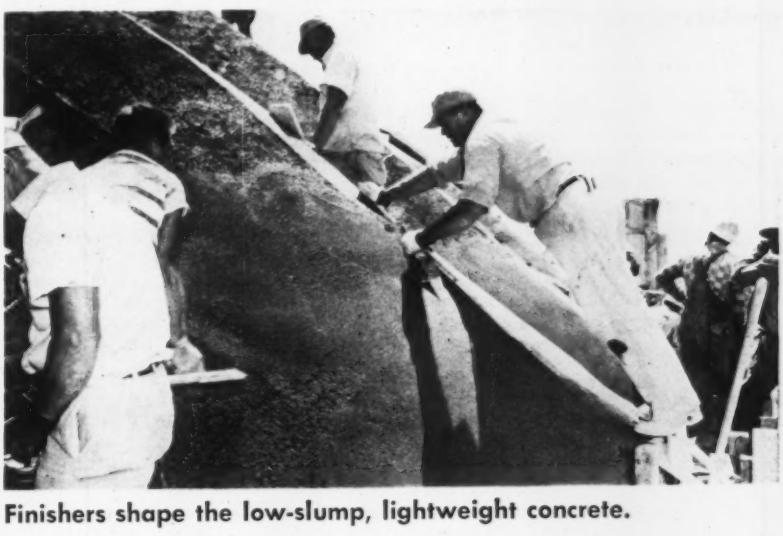
• Casting the first segment—As shown in the accompanying sequence of photos, casting of the first roof segment began at the outer edge and proceeded up to the center.

The outer crane hoisted the concrete in a 1-cu yd bucket directly into place. The workmen soon became adept at spotting the bucket and discharging its load to keep hand-shoveling of the concrete to a minimum.

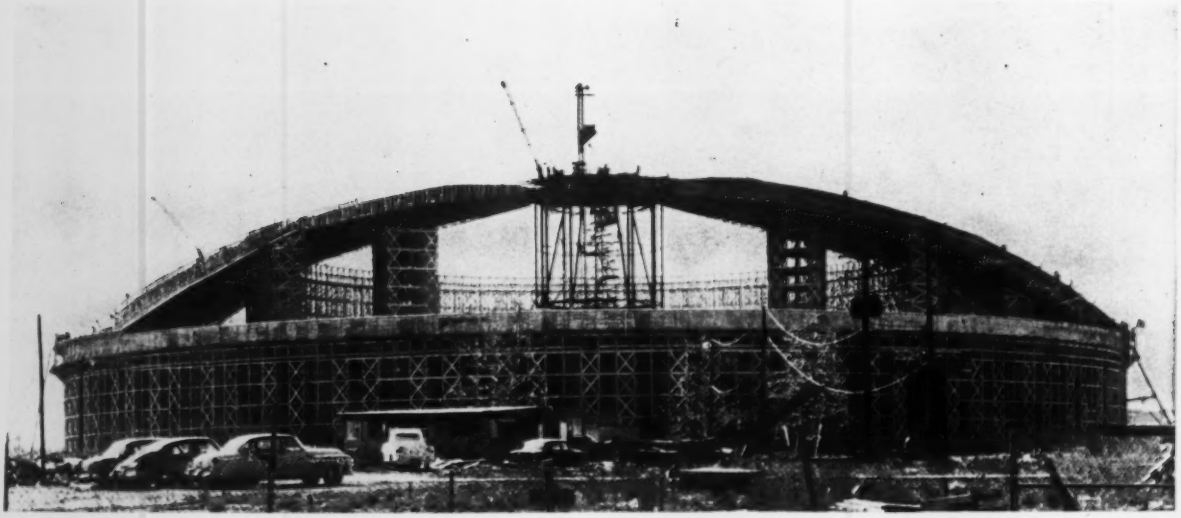
When the outer crane reached its limit for concrete placement, the inner crane went into action. But the contractor had determined beforehand that the total reach of its boom-and-jig wouldn't be enough to continue where the outer rig had left off. Carpenters were prepared with short chutes that were hoisted to the roof, placed in correct position and braced, ready to receive the first cubic yard of concrete hoisted by the inner crane. Shortly after the concreting had passed the halfway point, Felmley-Dickerson discontinued the chutes and the inner crane put the rest of the concrete directly in place.

All webs of the folded-plate roof are on a 45-deg angle. This calls for a low-slump concrete. Since the 3½-in.-thick webs are reinforced with two layers of reinforcing bars, careful vibrating of the

point of deposit on the dome.



Finishers shape the low-slump, lightweight concrete.



Concreting proceeds simultaneously on opposite segments of the folded-plate dome.

For hard-to-reach areas, crane feeds concrete to a chute (left). Shovelers assist (right).

concrete was necessary to insure good bond to the steel and prevent honeycombs.

A typical mix for 1 cu yd of concrete weighing about 106 lb per cu ft includes 1,070 lb of lightweight aggregate; 870 lb of cement; 530 lb of sand and 390 lb of water. It has about 5% entrained air.

The contractor cast the concrete directly on a 2½-in.-thick insulation and acoustic material, to be left in place as a ceiling. The insulating material was shipped in 8-ft long by 2-ft 8 in. panels, weighing 180 lb each, and sawed to fit the forms for the folded-plate ridges, valleys and connecting webs. Metal lugs anchor the material to the concrete.

Concrete finishers troweled the top surfaces of the roof to a dense finish, ready to receive a weatherproof plastic. Workmen with one-man water tanks wetted the concrete with a fine spray just ahead of the finishers. The concrete crew included about 25 men on the roof—placing, vibrating and finishing.

Forms for each roof segment are supported at five points—along the outer edge, at the center of the building, on a circular fixed timber tower at 130-ft radius and on two movable timber towers about halfway between the other three supports.

The segments are cast one at a time in a sequence that balances opposite segments. The shoring can not be removed from beneath any one segment until the opposite segment has been cast and cured.

The assembly hall will be used for basketball and other indoor sports, conventions, convocations, theater, ballet and symphony. It will contain 16,200 permanent seats and 1,800 movable seats. Nearly one-third the seats are below ground level. The bottom row is 24 ft below grade, the top row 36 ft above. A 30-ft-wide, glass-and-steel enclosed concourse, encircling the structure, will provide display space for trade shows and other exhibits.

Completion of the assembly hall is estimated for the fall of 1962.

W. S. Posten is resident architect for Harrison and Abramovitz of New York City, architects for the entire project. Edward Maliskas is project superintendent for Felmley-Dickerson Co.

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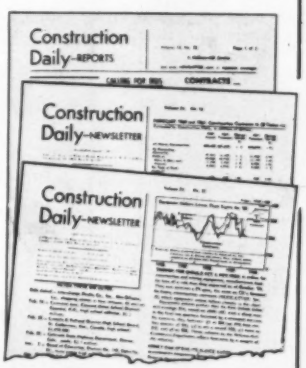

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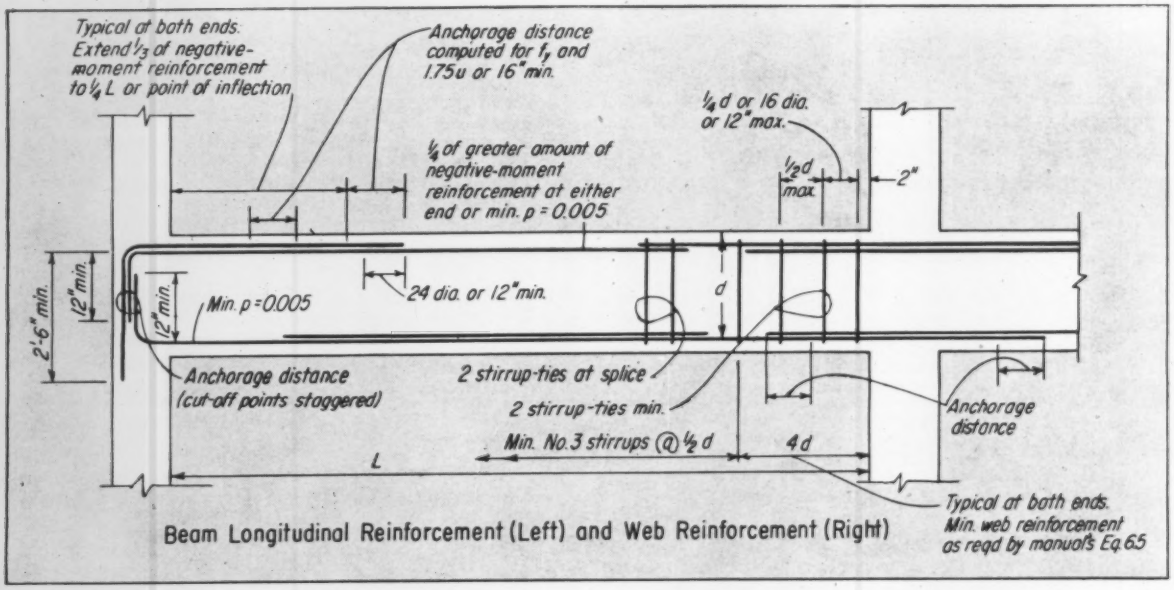
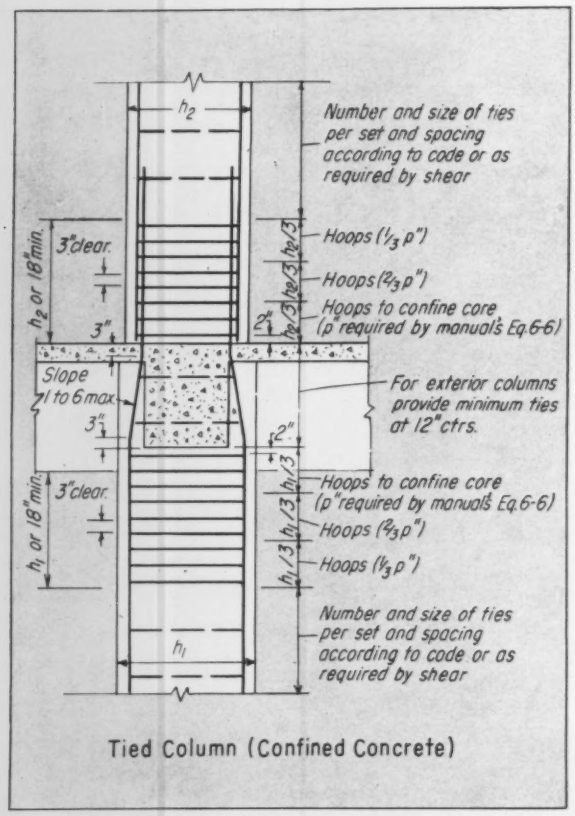
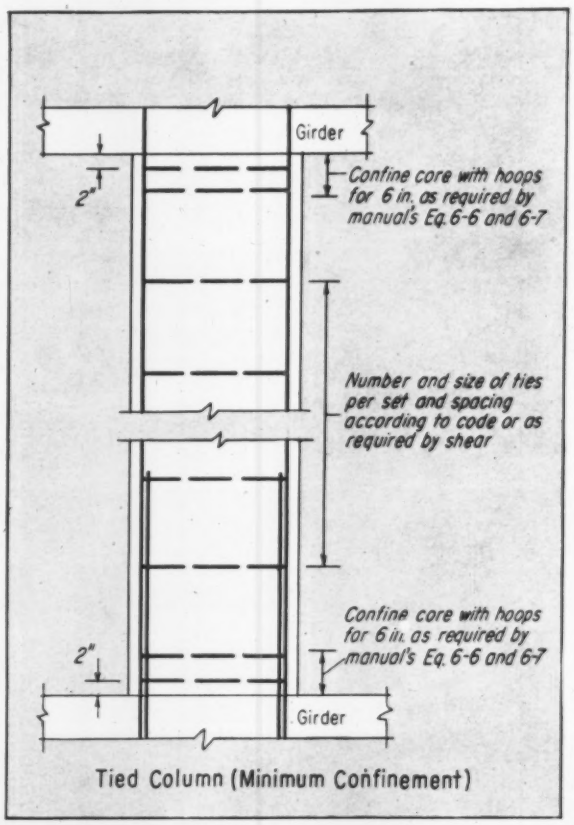
New manual will show how to design for necessary ductility and strength—

Earthquake Resistance in Tall


Typical at both ends. Extend 1/3 of negative-moment reinforcement to 1/4 L or point of inflection
Anchorage distance computed for f_y and 1.75u or 16" min.
1/4 d or 16 dia. or 12" max.
1/4 of greater amount of negative-moment reinforcement at either end or min. p = 0.005
1/2 d max.
2"
2'-6" min.
12" min.
12" min.
Min. p = 0.005
24 dia. or 12" min.
d
Anchorage distance (cut-off points staggered)
2 stirrup-ties at splice
2 stirrup-ties min.
Min. No. 3 stirrups @ 1/2 d
4 d
L
Anchorage distance
Typical at both ends. Min. web reinforcement as reqd by manual's Eq. 6.5
Beam Longitudinal Reinforcement (Left) and Web Reinforcement (Right)

FOR GIRDERS, seismic design dictates complete web reinforcement, well-anchored longitudinal bars and overlapping splices.


h_2
Number and size of ties per set and spacing according to code or as required by sheor
3" clear.
h_2 or 18" min.
3"
Hoops (1/3 p")
Hoops (2/3 p")
Hoops to confine core (p" required by manual's Eq. 6-6)
2"
Slope 1 to 6 max.
3"
For exterior columns provide minimum ties at 12" ctrs.
2"
3" clear.
h_1 or 18" min.
Hoops to confine core (p" required by manual's Eq. 6-6)
Hoops (2/3 p")
Hoops (1/3 p")
Number and size of ties per set and spacing according to code or as required by sheor
h_1
Tied Column (Confined Concrete)


Girder
2"
Confine core with hoops for 6 in. as required by manual's Eq. 6-6 and 6-7
Number and size of ties per set and spacing according to code or as required by sheor
Confine core with hoops for 6 in. as required by manual's Eq. 6-6 and 6-7
2"
Girder
Tied Column (Minimum Confinement)

FOR COLUMNS, seismic design requires hoop reinforcement at the joints with beams and girders. Reinforcement percentage, *p*, must provide the confining effect of a spiral as required by the American Concrete Institute code.

Concrete Buildings

How do you design tall concrete-framed buildings to resist earthquake forces?

The Portland Cement Association will soon issue a manual aimed at answering that question: "Design of Multistory Reinforced Concrete Buildings for Earthquake Motions."

The manual is based on an earthquake design code developed by the Structural Engineers Association of California (ENR Mar. 19, 1959, p. 56). This code requires ductility and energy absorption in structural frames of tall buildings.

The first released version of the California code required buildings over 13 stories high to be steel framed. The committee later modified this position (ENR Oct. 15, 1959, p. 30) so the code now reads:

"The (moment-resisting) frame shall be made of ductile material or a ductile combination of materials. The necessary ductility shall be considered to be provided by a steel frame with moment-resistant connections or by other systems proven by tests and studies to provide equivalent energy absorption."

• **Research shows the way**—This modification encouraged the Portland Cement Association to undertake a special study of the resistance of reinforced concrete structures to dynamic loads imposed by earthquakes. The study led to the manual which presents analytical and design procedures and makes recommendations for use in design of ductile reinforced concrete frames satisfying code provisions.

PCA staff engineers led by Leo H. Corning, chief consulting structural engineer, did much of the work on the manual. But PCA leaned heavily on the efforts of two co-author consultants and their staffs: John A. Blume, president, John A. Blume & Associates, Engineers, San Francisco; and Nathan M. Newmark, head, Department of Civil Engineering, University of Illinois.

The manual reviews earthquake phenomena and responses of structures. It discusses principles of earthquake-resistant design and design codes. It then gets into the strength, ductility and energy absorption of reinforced concrete members. This information is applied to the design of reinforced concrete frames; the analysis and design of a 24-story building serving as an example. A chapter on construction and inspection concludes the manual.

• **Ductility, the key**—The California code writers considered ductility so important in the design of a tall building for earthquake resistance that much of the manual discusses ductile qualities of concrete.

Research into the strength characteristics of reinforced concrete members during the last two decades has pointed the way to development of design methods based on ultimate-strength characteristics. The ductility and energy absorption capacity of reinforced concrete has also been investigated, particularly in regard to blast resistance of protective structures. But no particular effort had been made to develop design rules to insure ductility and energy absorption in ordinary structures until the provisions of the California code required it.

Researchers had to re-evaluate past tests from the standpoint of ductility. They also had to pursue a new test program to investigate further the interrelationship of other variables, such as concrete strength, maximum strain in concrete at ultimate load, yield strength of steel, percentage of reinforcement, interaction of axial load and moment.

The definition of ductility might be paraphrased as being the reserve capacity that a structure has so that it can deform considerably without failing after the elastic limit has been passed. The manual uses as a measure of this reserve term ductility factor—the ratio of the maximum useful elastoplastic deformation to the deformation at yield, which is the point where plastic behavior begins. The authors conclude that tall reinforced concrete structures should have a minimum ductility factor of about 4 to 6 to resist earthquakes of the West Coast of the U. S.

The authors develop the concept that requiring a structure to remain elastic for all possible earthquakes is grossly uneconomical. It would demand too great a cost for the probability.

In moderate earthquakes of frequent occurrence, a structure should remain elastic with no visible or actual damage. But under conditions of the most severe probable earthquake, the structure may yield locally, going into the inelastic range without suffering significant structural damage, according to the manual's recommendations.

The California code recognizes dynamic implications of seismic forces, by requiring that the lateral forces vary with the height of the structure and that they be reduced for ductile behavior.

(*Please turn the page*)

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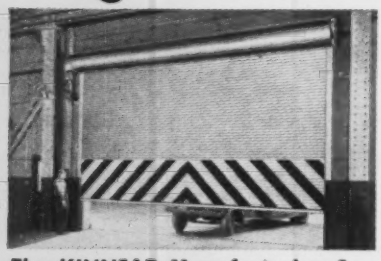

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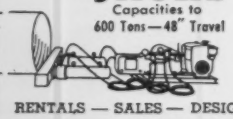

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The reasoning is that inelastic action does not necessarily invalidate elastic relationships but introduces some modifications. When a multistory structure becomes inelastic, the forces generated by the specific motion are reduced in magnitude. Therefore, ductile buildings can be designed for lateral shears that are less than the shears of the elastic system.

• **Designing for ductility**—According to the new PCA manual, designers can be assured their reinforced concrete buildings will have adequate ductility and energy absorbing capacity to sustain severe earthquakes if they provide (1) proper balance of tensile and compressive reinforcement; (2) shear reinforcement in beams and columns to avoid shear failure even at ultimate; (3) hoop reinforcement of tied columns near the joints; and (4) adequate splicing and anchorage of reinforcement.

The ductility factor as developed in the manual is an inverse function of the percentage of tensile reinforcement less the percentage of compressive reinforcement and is related to the concrete strength.

Thus, tensile reinforcement should be kept as low as practical for the required strength. For a given percentage of tensile reinforcement, ductility can also be increased by adding compressive reinforcement. Even so, minimum top and bottom reinforcement should be provided in beams to resist anticipated reversal of moments resulting from severe ground motions.

Amount of reinforcement, of course, is dependent on concrete strength. The manual recommends a minimum strength of 3,000 psi, but 3,750 psi is preferable. And it suggests 5,000-psi concrete in lower-story columns of tall buildings in order to minimize the column size.

Although ductility considerations might lead to reduction of longitudinal steel in concrete members, additional shear or web reinforcing is usually indicated.

Members must have enough transverse web reinforcement so that their strength is governed by ductile flexure and not by shear. The required maximum shear capacity is quite easy to compute, since it is a function of the superimposed loads and the ultimate moment capacity.

• **Column design**—A combination of axial load and moment results in decreased ductility. For this reason, a special means of reinforcing may be needed near the tops and bottoms of columns.

Axial load capacity and deformation characteristics of spiral columns are superior to those of tied columns, according to the manual. Spiral reinforcement confines the concrete within the core to create triaxial stress conditions at ultimate. Capacity of the spiral column does not decrease even though the unconfined concrete cover spalls.

The same effect can be reproduced in tied columns if sufficient rectangular hoop reinforcement is introduced at the points of maximum moment—that is, near the joints—to confine the concrete core. This confinement maintains the load-carrying capacity of the columns while at the same time increasing the ductility.

Splicing and anchorage details are important because the structure may be subjected to large deformations. The designer must insure that all splices continue to function, that no planes of weakness are formed by terminating all bars at the same section, and that sufficient anchorage is provided at all cut-off points.

All reinforcement details must be inspected to insure that the requirements for splicing and anchorage are met. The time needed to perform these additional computations and checks is minor compared with the usual labor involved in design.

Although it is necessary to increase some of the steel quantities to meet ductility requirements, the increase in building costs will be minor. Thus, for a rather small investment, the designer can be assured that the building will have adequate ductility and energy absorbing capacity to sustain even the most severe earthquakes.

• **Sample design**—The manual presents as an example the design of a 24-story building subjected to both elastic and inelastic analysis. The latter analysis shows that application of the code of the Structural Engineers Association of California, along with design and detailing limitations of the manual, will usually result in a structure satisfying both ductility and energy absorption requirements. However, the manual points out that a structure having no energy-absorbing elements except its bare structural frame may require provision for higher shearing forces in the upper stories.

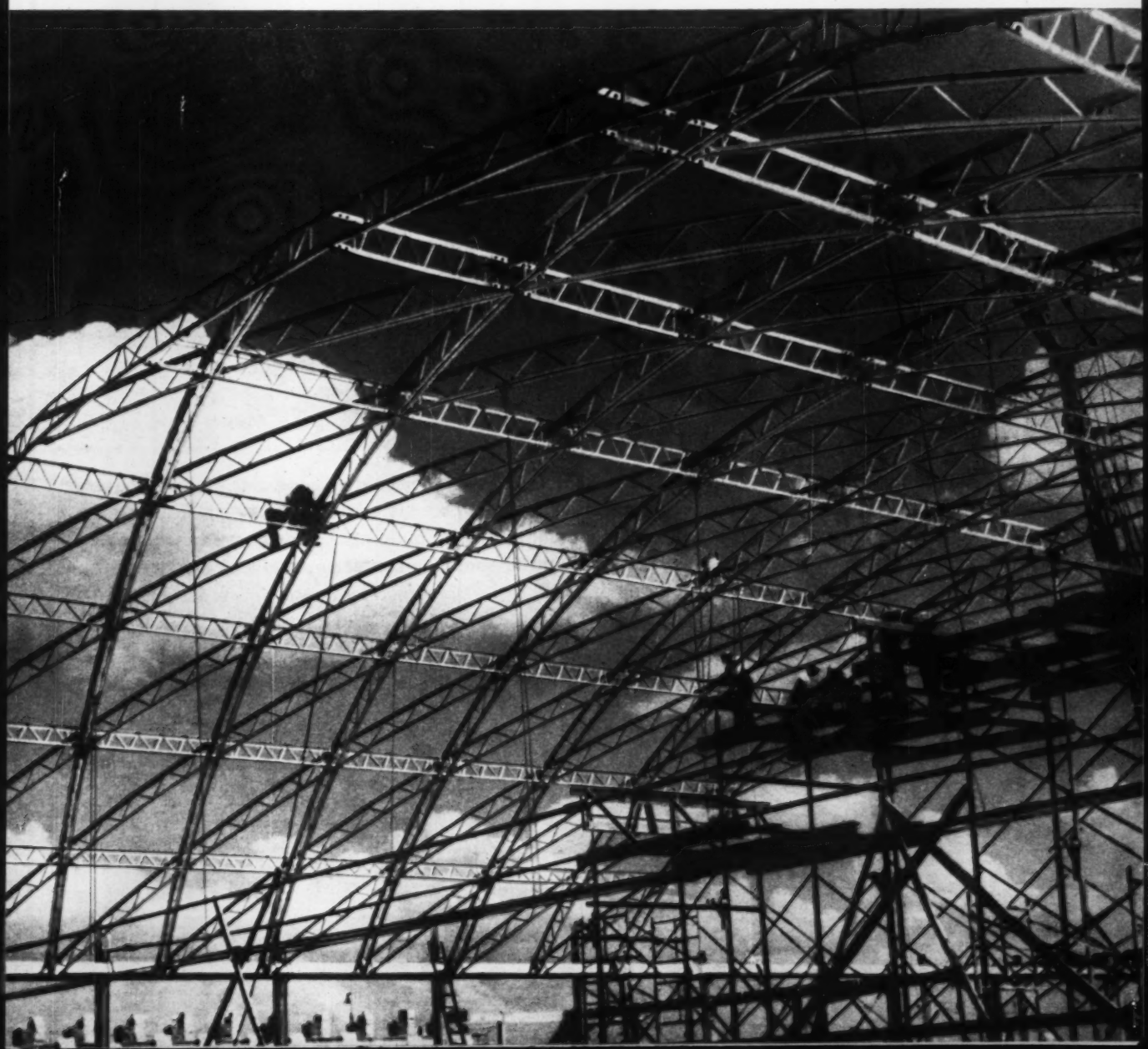
The concluding chapter of the manual deals with construction and inspection of concrete structures. It emphasizes, of course, the necessity of good workmanship. It suggests that the structural engineer who has had the responsibility for preparation of plans should be retained to supervise the construction in the interest of the owner, the public and the professional reputation of the architect, engineer and contractor. Such supervision should include a physical testing program—most likely worked out with an independent testing lab—to back up visual inspection.

Shopper stopper of steel. Long before the Preston Royal Village Shopping Center in Dallas, Texas, was completed, this unusual *curved* steel roof was attracting hundreds of potential customers. This supermarket roof, using structural steel in striking Lamella construction, is just one part of the $2,000,000 center. The vast supermarket building alone encloses almost 20,000 square feet of shopping space containing one of the most complete displays of food in the Southwest. And there isn't a column or post in the entire sales area. The Lamella construction was by Roof Structures, Austin, Texas.

USS United States Steel

TRADEMARK

See next two pages



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Interesting details — Preston Royal Village. The $2,000,000 shopping center is one of the largest in the Southwest—110,000 feet of floor space. This first use of steel Lamella construction in this area eliminated columns and permitted a gracefully curving roof for the main building. 26 businesses, including a theater, restaurant and service station, are housed in the shopping center . . . and fast erection with structural steel permitted early opening for all of them.

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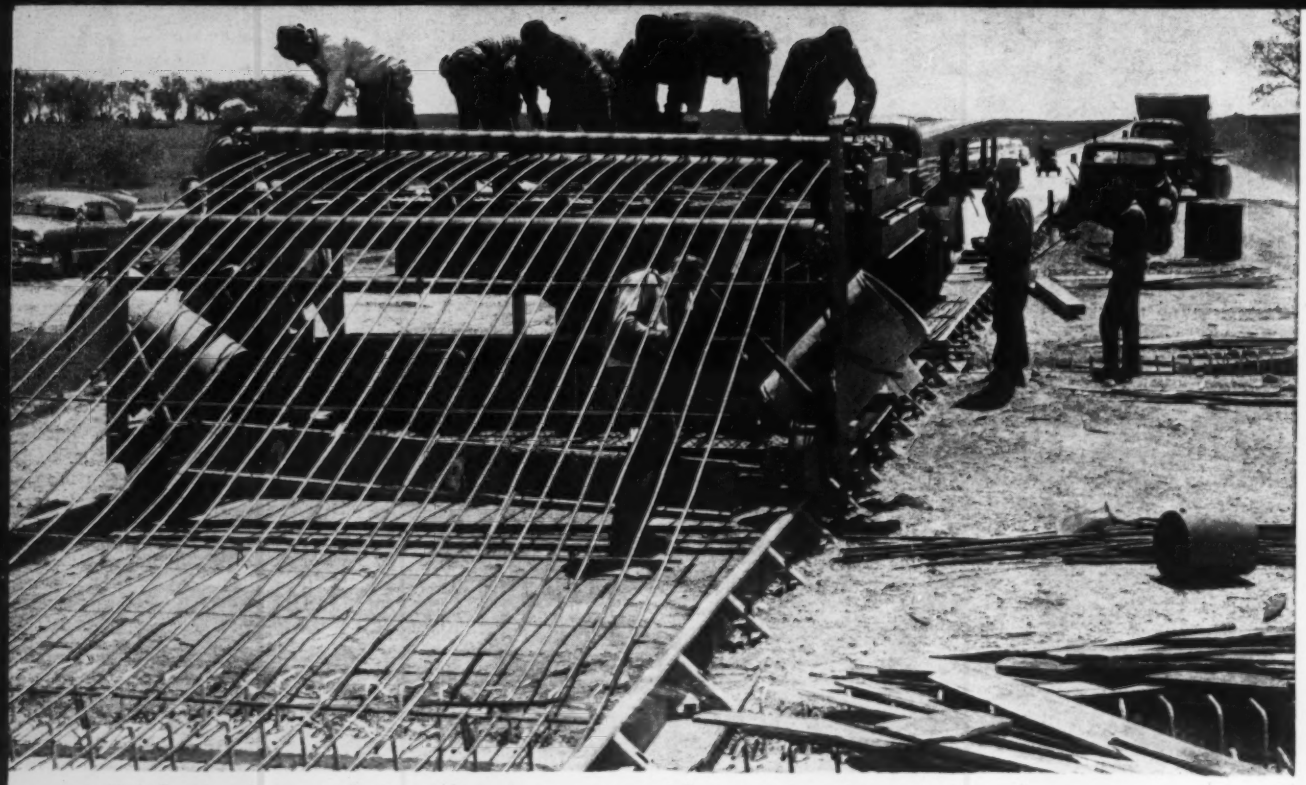


Reinforcing bars settle into place between road forms as supply truck moves forward.

Contractor-Built Machines Pave

Workmen on truck splice 24 lines of reinforcing steel.

Two contractor-designed-and-built machines proved their worth this summer in placing 4.2 miles of continuously reinforced concrete pavement on I-90 about 10 miles north of Madison, Wis.

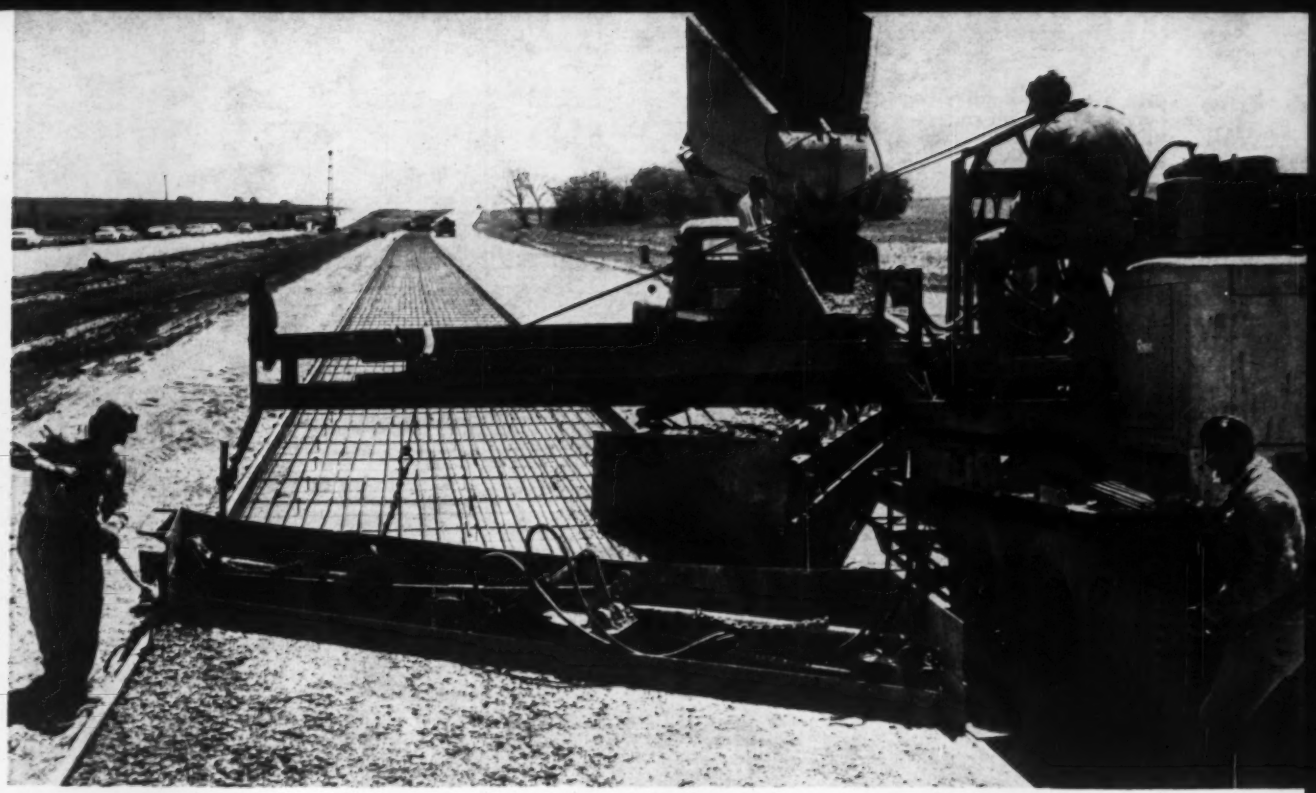
One machine placed the reinforcing bars between the road forms. The other placed concrete in the forms.

The $762,000 project includes twin 24-ft pavements on a gravel base. Both pavements are 8 in. thick, reinforced with continuous longitudinal lines of $\frac{5}{8}$-in. reinforcing bars spaced 6 in. c-c, and $\frac{3}{8}$-in. transverse bars every 4 ft.

They will serve as test sections, says E. L. Roettiger, state highway engineer. Their action under traffic will be compared with that of adjacent 9-in. pavements reinforced with welded wire mesh.

• **Continuous reinforcement**—Workmen placed the reinforcing bars in each 12-ft lane in a fast-moving, smooth-working operation. They used a machine designed and built by William F. Mengel, vice-president of the F. F. Mengel Co., contractor on the job.

The machine trailed behind a flat-bed truck, laying the 24 lines of reinforcing bars in a continuous operation. The 40-ft bars were carried on the bed of the truck. Two workmen hand-fed them through 24 pairs of guide sheaves on a 12-ft long spindle. The bars



Side-mounted vibrating screed strikes off and compacts concrete placed between forms.

Continuously Reinforced Highway

passed over this spindle, then over a second spindle, and between two rollers at the rear of the machine as the truck moved ahead in 4-ft increments. After passing over the rear roller the network of reinforcement sagged down between the road forms, where it was supported on metal chairs.

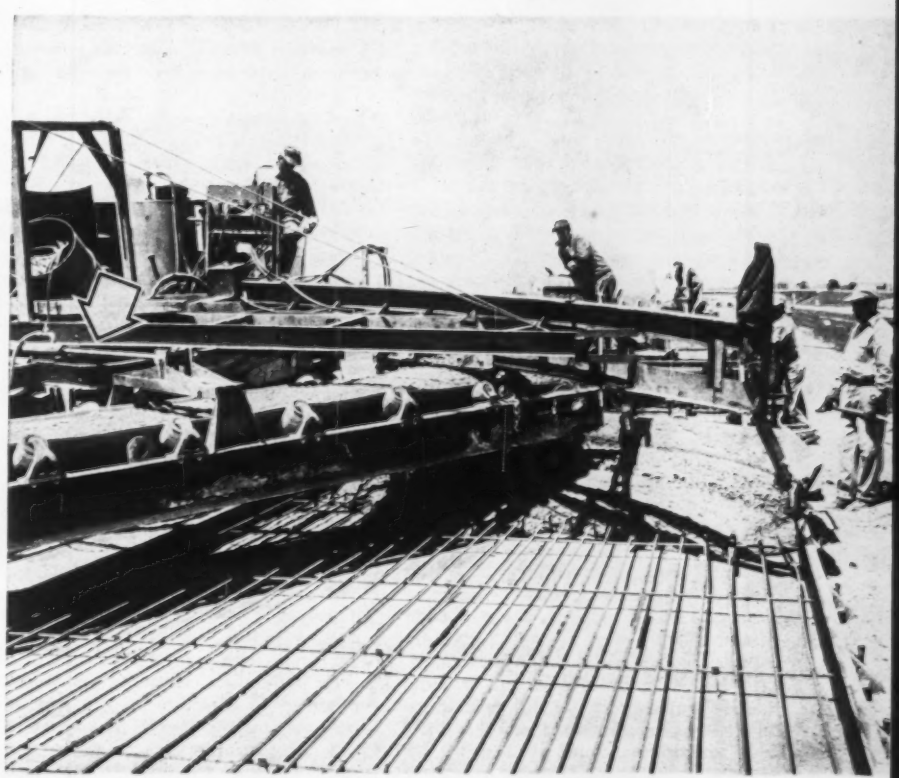
Three workmen at the front spindle spliced the ends of the longitudinal bars together with twisted wires. Five men at the rear spindle tied the intersections of the transverse and longitudinal bars.

A workman on the ground snapped three metal chairs to each cross bar to support the entire mat of steel on the subgrade. Two more finished tying all intersections after the mat had settled down between the road forms.

The best day's work of this crew was 4,000 lin ft of reinforcement for a 12-ft width of pavement in 10 hours.

Design plans called for the longitudinal bars to overlap at least 16 in., but splices averaged 18 in., according to John Hansen, resident engineer for the Wisconsin State Highway Commission.

The plans permitted all 24 splices to be made at the same location, or staggered in a geometric pattern. For the first three days the contractor's crew made all splices every 40 ft at the same location. Then, Mr. Mengel got per-



Hydraulic ram (arrow) moves belt conveyor back and forth.

mission from the Highway Department to vary gradually the location of the splices until they were on a staggered pattern. This enabled the tying crew to make the splices faster.

• **Anchors and joints**—At the beginning of the job, all 24 lines of reinforcing bars were anchored to stirrups embedded in a concrete filled trench extending transversely across the width of pavement.

There are four of these anchors, called terminal pavement anchors, at each end of both 24 ft pavements. The first one is located 6 ft from the end of the pavement, with the others spaced 40 ft c-c.

The 8-in. thick pavement is thickened to 12 in. at each anchor, using a 4-in. by 24 in. beveled haunch on each side of the 2 ft thick anchor, which extends into the subgrade 4 ft below the bottom of the thickened slab. A 4x8 in. by 24 ft construction keyway is formed between the top of the anchor and the bottom of the thickened roadway slab.

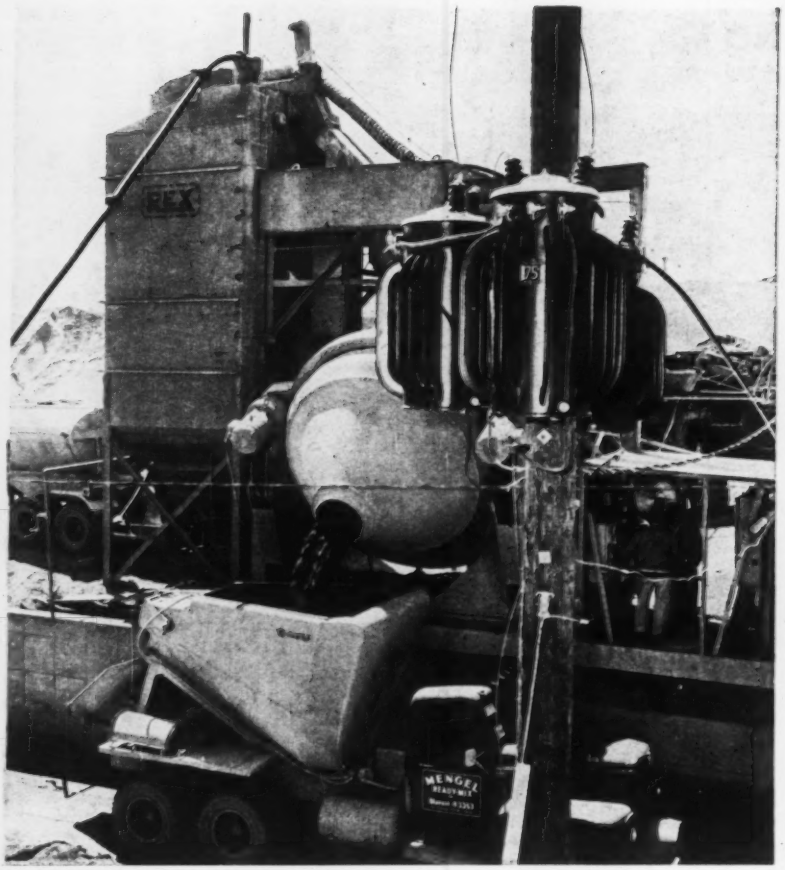
Each anchor is reinforced with four No. 5 bars placed longitudinally with the anchors and No. 5 stirrups at 6 in. c-c across the full 24 ft width of the anchor.

The pavement has no expansion joints, although ¾-in. Wisconsin standard type expansion joints are provided where the continuously reinforced concrete pavement joins conventional concrete pavement reinforced with welded wire mesh. These joints have standard shear-transfer dowels bonded to the concrete on one side of the joint and free to slip on the other side. This type of expansion joint is also used at bridge structures.

Transverse construction joints at the end of each day's paving operations are Wisconsin's standard. They are formed with a split timber type header composed of 4x4-in. x 12 ft timbers for the top half and a 4x4-in. x 12 ft timber sawed in two on a taper, for the bottom half.

Holes through the timber header assembly provide for the No. 5 main reinforcing bars spaced 6 in. c-c, and 1 in. dia by 18 in. long dowel bars at 12 in. c-c, between every other pair of main reinforcing bars. Steel pins driven through 1⅛ in. dia holes in the header and into the subgrade hold the timber header in position.

Since these pavements were constructed in 12 ft widths, a keyed construction joint was formed longitudinally on the center line of the pavement with No. 4 reinforcing bars 2 ft long spaced 3 ft c-c to tie the two pavements together. The contractor sawed a ⅛-in. wide longitudinal joint to a depth of 1½ in. down the center line of pavement.



CONCRETE PLANT, electrically powered and push-button operated, discharges 6.8-cu-yd batch into agitator-type truck for 4-mile haul to job site.

• **Placing concrete**—Base of the rig for placing concrete in the forms is a four-wheel drive truck chassis lengthened to about 40 ft. It has power steering on the front wheels. A 36-in. wide belt conveyor extends from the front of the machine to near the rear. Dump trucks discharge concrete on the front of the conveyor, which is pivoted at that point. A hydraulic ram swings the outer end of the conveyor back and forth to deposit concrete over the 12-ft width between the road forms.

The concrete-placing machine eliminates the conventional concrete spreader. An automotive engine propels the machine forward. It operates outside the forms, and counter-weights offset the weight of the loaded conveyor when depositing concrete.

An electric plant on the machine generates power for a motor that drives the conveyor, and for a motor for the hydraulic pump that actuates the hydraulic ram that swings the conveyor.

The hydraulic system also positions the screed to clear the reinforcement or to strike-off the pavement at correct grade. Also it raises the screed for traveling and releases the hook that couples the truck to the spreader while discharging concrete on the conveyor belt.

A finishing machine with a double-blade vibrating screed followed closely behind the concrete-placing machine. Next in line came a second finishing machine. It mounted two transverse screeds and a sliding pan that shaped the pavement to the proper crown and smoothness.

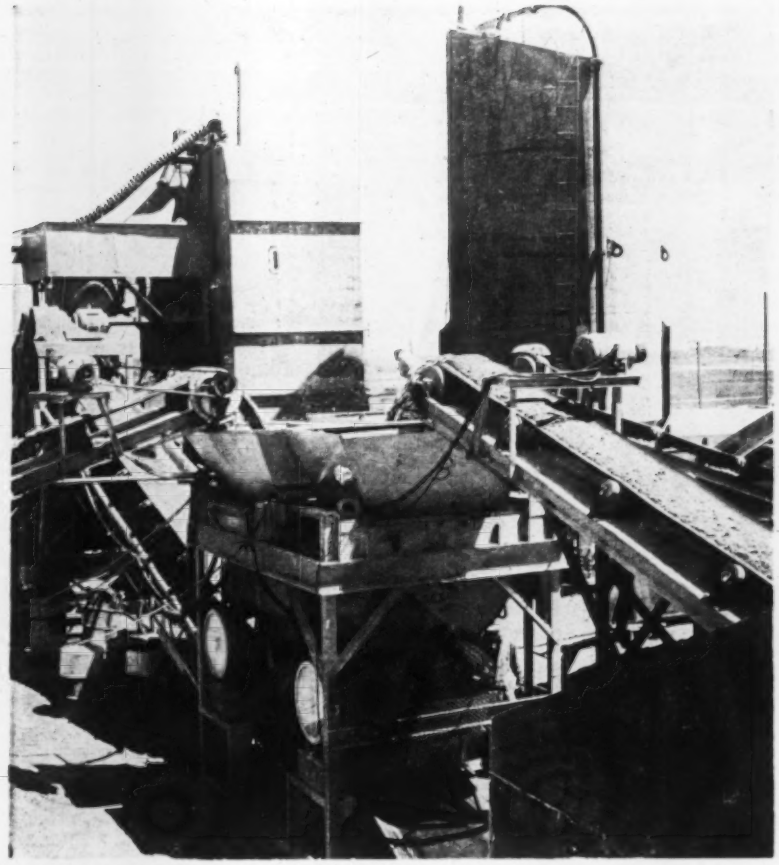
Workmen with long-handled aluminum screeds and a burlap drag then gave the pavement its final finish.

Eight agitator-body trucks hauled the concrete from a central mixing plant, near one end of the job. Each truck delivered 6.8 cu yd of concrete.

• **Concrete plant**—Concrete was mixed in a central plant, in a 168-S (168 cu ft) tilting mixer. The mixer discharged directly into the trucks operating in a depressed ramp.

The plant produces concrete for other paving contracts by Mengel in that area. Three 24-in. inclined belt conveyors transport the sand and two sizes of aggregates from 40-cu yd bins to three weighing hoppers.

After being weighed, the material drops onto a 48-in. inclined deep-trough belt that carries it to the mixer.



THREE CONVEYORS bring sand and aggregates to automatic weighing hoppers that feed another conveyor for charging the concrete mixer.

Cement, air-entraining agent and water are added directly into the mixer.

A panel at the mixer operator's station automatically controls all operations of the plant. The sand and aggregate belts automatically stop as soon as they have discharged the correct weight of materials into the weighing hoppers. The conveyors automatically start again as soon as the weighing hoppers have discharged their batches onto the 48-in. belt and the discharge gates have closed.

The contractor mounted all components of his concrete plant on pneumatic tires for mobility. He fabricated the three aggregate and sand bins, each of which is 11 ft wide and 10 ft high. Each has a rear axle with wheels and a front fifth wheel to be towed by a truck-tractor. They move over the highway with a special permit from the state highway department.

Water pumps and pushbutton controls are mounted on the truck chassis that carries the concrete mixer. A commercial high line delivers electricity for operating the plant. Two 40-hp motors drive the mixer and two 15-hp motors furnish power for the hydraulic system that tilts the mixer.

• **Aggregate production**—Crushed gravel and sand are produced and stockpiled near the concrete plant by Arthur Overgaard, Inc., under a subcontract with Mengel.

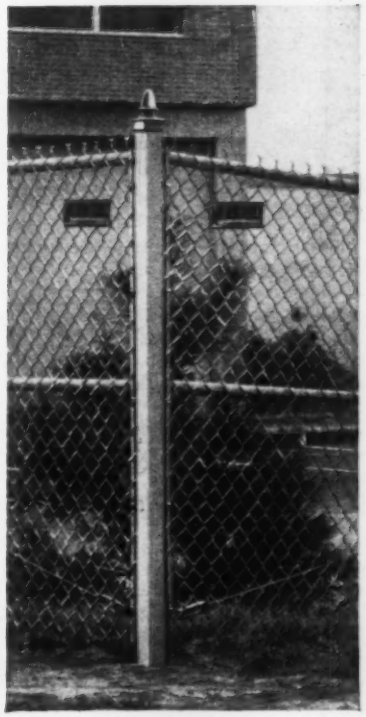
Working a 40-ft face of cut, a 1½-cu yd shovel loads the pit-run gravel into 15-ton end-dump-trucks that deliver it a short distance to a scalper and a 24x36-in. crusher.

From the crusher the material passes through a portable screening plant into dump trucks that circle the concrete plant and dump their loads over a reclaiming tunnel located midway between crusher and plant.

A 30-in. by 80-ft conveyor carries the materials to a washing plant with a 4x14-ft screen and a 30-in. twin sand screw. Three 24-in. wide by 100-ft long conveyors then stockpile the sand and the two sizes of aggregate.

All three stockpiles are close enough to the concrete plant so that one 4-cu yd tractor shovel easily keeps the three bins charged with aggregates and sand at all times.

Don Klement is construction superintendent for the F. F. Mengel Co., and Wallace Morriss is concrete superintendent.



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One Water Agency Does Two Water Jobs

Two of the world's biggest water problems are to maintain the quality of the water we have and to distribute it where it's needed.

Albert E. Berry, general manager and chief engineer of the Ontario Water Resources Commission, (OWRC) believes these two problems should be tackled jointly.

"The relationship between pollution control and water resources development is so strong that they can only be worked together," says Mr. Berry.

This double-barreled approach is the key to the success the five-year-old commission has had in helping to provide Ontario's 6 million people with "pure water in abundance and evenly distributed."

Admittedly, the Province of Ontario, with an area greater than Texas and New Mexico combined and fewer people than reside in New York City, has comparatively small-scale water problems. But Ontario does have problems and they're very similar to water troubles, large or small, that exist all over the world.

It's not the variety or amount of Ontario's water problems that is unusual. It's the way OWRC goes about solving them and the mild-mannered dynamo of a man who heads this operation.

Albert E. Berry, chief of Ontario's Water Resources Commission.

• **About the man**—Albert E. Berry looks like a kindly family doctor who might light up his pipe, sink back into an overstuffed chair, and discuss the affairs of the day after diagnosing your child's chickenpox.

Instead, he greets visitors warmly, says he has to catch a train in a half-hour, and then goes about proving that he lives and works (lives his job is more like it) at a staggering pace.

Six- and seven-day weeks are routine for the OWRC head man and the days often run to 12 and 15 hours. Despite this heavy schedule, Albert Berry manages to carry out the duties of secretary-treasurer of the Canadian Section of the American Water Works Association, a job he has held since 1931. He is also a 30-year-man as secretary-treasurer of the Canadian Institute of Sewage and Sanitation.

Mr. Berry is a past president of both the Water Pollution Control Federation and AWWA. He was chairman of the Toronto Branch, Engineering Institute of Canada, as well as vice president of the Institute. Right now, he is chairman of the Pollution Control Board of Ontario and a member of the Advisory Board to the International Joint Commission on Pollution of Boundary Waters.

Born 64 years ago, Albert Berry graduated from the University of Toronto in 1917, just in time to serve his country in World War I with the Royal Canadian Engineers.

After the war, he went to work for the Ontario Department of Health. He was appointed director of the department's division of sanitary engineering in 1926, the same year he received his Ph.D. in public health.

Mr. Berry held this post until 1957, the year after he became general manager and chief engineer of the Ontario Water Resources Commission.

• **About OWRC**—A 1955 survey of the province revealed that the problems of providing an adequate and safe water supply to the people of Ontario were increasing. The provincial government created the six-man Ontario Water Resources Commission in 1956 and assigned it the duel role of providing adequate water and overseeing the disposal of waterborne wastes. The provincial lieutenant governor in council appoints commission members.

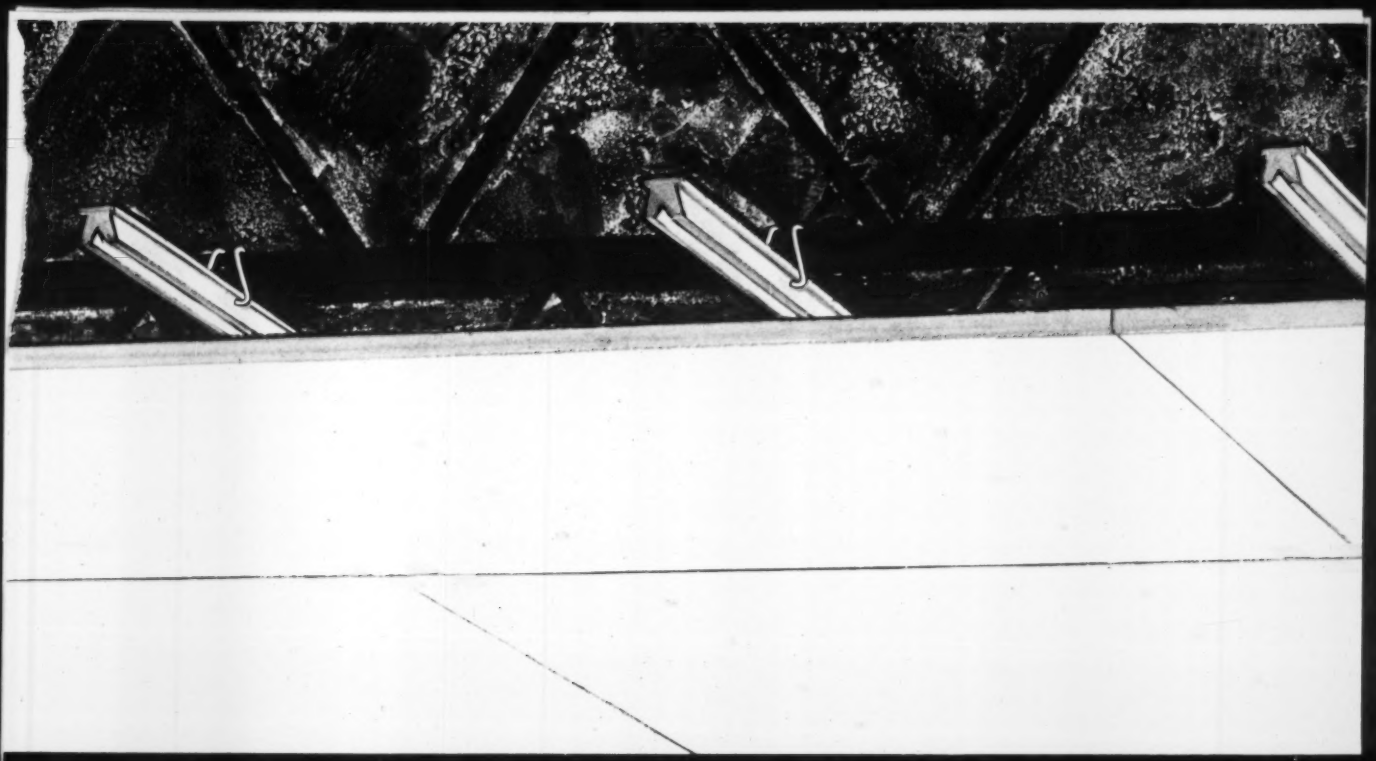
"The general campaign of OWRC," Mr. Berry explains, "is to compel municipalities and industries to clean up pollution problems. We do this not only by advising, but also by lending them money so they can do the work on their own. The Commission helps build the plants and operates them after they have been built. In this way, we are different from any commission anywhere in the world."

The Ontario Water Resources Commission Act, amended several times since the original draft, now sets forth broad sweeping objectives for OWRC. It also provides the Commission with the power and authority to get the job done. It is the Commission's function and power:

• To control the collection, production, treatment, storage, transmission, distribution and use of water for public purposes.

• To construct, acquire, provide, operate and maintain waterworks and to develop water supplies and make

(*Story continued p.* 51)



FOR BAR JOIST CONSTRUCTION—
NEW LOW-COST FIRE PROTECTION

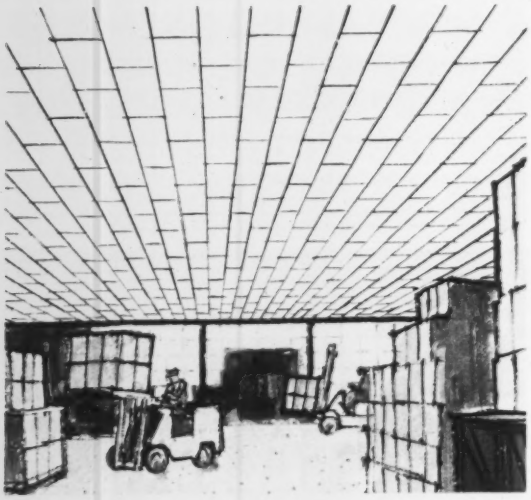
Armstrong Fire Guard Nailing Panel

INFORMATION AND SPECS
ON FOLLOWING PAGES

NEW FROM ARMSTRONG . . .

Fire Guard Nailing Panel to meet your need

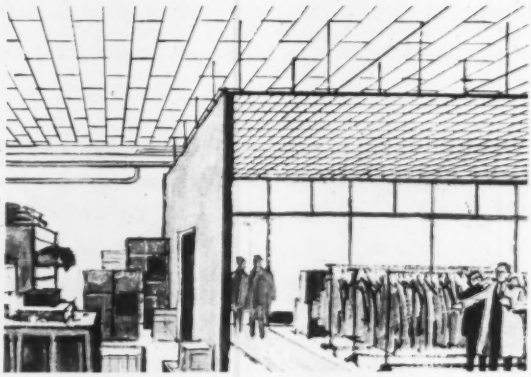
A fire-retardant mineral fiberboard ceiling material, Fire Guard Nailing Panel is designed to provide rated fire protection at low cost for many types of industrial and commercial construction. Easily installed, it eliminates the expensive delays of conventional "wet" methods of fireproofing.



TWO-HOUR ASSEMBLY RATING— THREE-HOUR JOIST PROTECTION

Rated construction of one-, two- or three-hour fire resistance is often required by local codes in basements, warehouses, factories, boiler rooms and similar areas where bar joist construction is frequently used. Fire Guard Nailing Panel has been specially developed for uses of this type. It offers both rated fire protection *and* fast, economical installation.

With concrete slab and open-web steel joist construction, Fire Guard Nailing Panel received an official two-hour assembly rating from Underwriters' Laboratories, Inc. (UL test R4340-1). When the UL test was continued past the three-hour mark, the ceiling of Fire Guard Nailing Panel still provided effective fire protection for the steel joists.



EXCELLENT FOR DOUBLE CEILING CONSTRUCTION

As the upper ceiling, Fire Guard Nailing Panel is attached directly to bar joists to provide necessary fire protection. A conventional acoustical ceiling may then be suspended over those areas of the building where appearance is a prime factor. For instance, a retail store may house both storage and selling areas under a common ceiling of Fire Guard Nailing Panel. Then a finished ceiling, such as Armstrong Travertone, may be installed only over the selling area, to meet decorative and acoustical requirements. Future expansion of office and selling spaces can be easily accommodated by simply adding finished ceilings whenever they are required.

Building owners and managers will find Fire Guard Nailing Panel an economical method of providing fire protection in unleased areas of a building. Future tenants can select finished ceilings at the time of occupancy.

PRIMED SURFACE FINISH

The surface of Fire Guard Nailing Panel is a smooth primed and ironed paint finish that gives a clean, trim appearance. This surface also will provide an excellent base when an additional paint finish is desired.

for low-cost membrane fire protection

SAVES UP TO SIX WEEKS' CONSTRUCTION TIME

The delays in construction caused by conventional "wet" methods of fireproofing are completely eliminated with Fire Guard Nailing Panel. No extra moisture is introduced into the building. The large, lightweight, easy-to-handle panels go up quickly and easily. Construction time can be reduced up to six weeks.

EASY INSTALLATION

Installation is accomplished by attaching standard type nailing channels directly to bottom chords of steel bar joists. Fire Guard Nailing Panel is then nailed to the channels.

Staggered end joints of the Nailing Panels are reinforced at each intersection by a steel bridging clip.

To insure that installation will achieve the desired time-design rating, step-by-step installation specs are included with each bundle of material (see following page).

CONVENIENT SIZE

Nailing Panel is manufactured in 22½" x 64" x ⅝" size so that each unit consists of ten square feet. It is packed eight pieces (80 square feet) per bundle.

OVER

Specifications for new Armstrong Fire Guard Nailing Panel

MATERIAL

Membrane fire protection shall provide (two-hour, three-hour) protection for structural steel, as tested by Underwriters' Laboratories, Inc. Membrane fire protection shall consist of incombustible mineral fiberboard attached to standard type nailing channels.

a. Incombustible mineral fiberboard shall be Armstrong Fire Guard Nailing Panel as manufactured by the Armstrong Cork Company. Nailing panels shall be nominal 22½" x 64" x ⅝" in size and shall be factory-sanded with a primed and ironed paint finish. Nailing panels shall be incombustible and carry the Underwriters' Laboratories Fire-Retardant Classification label.

b. Nailing channels shall be fabricated from electrogalvanized steel of a minimum thickness of .020". Couplings for splicing the nailing channels shall be as recommended by the manufacturer of the nailing channel.

INSTALLATION

The fire-protective membrane shall be installed in strict accordance with the manufacturer's recommendations and in such a manner as to achieve the specified fire-retardant time-design rating.

a. Installation of nailing channel. The contractor shall furnish and install nailing channels. The nailing channels shall be attached to the bottom chords of steel bar joists (or to 1½" carrying channels) with double strand of #18-gauge tie wire or suitable-type nailing clips. Tie wires or clips should be placed at such intervals that the span of nailing channels does not exceed 48". The nailing channels shall be spaced approximately 16" on center at right angles to the supporting members. Nailing channels shall be spaced approximately 3" from walls paralleling the direction of the nailing channels. Approximately ¾" clearance shall be maintained between the ends of the nailing channels and the walls perpendicular to the direction of the nailing channels. Where adjacent channels are spliced together, clearance of approximately ½" shall be maintained between ends of nailing channels.

b. Installation of nailing panels. The contractor shall furnish and install Armstrong Fire Guard Nailing Panels. The nailing panels shall be applied with the long dimension at right angle to the nailing channels, staggering the end joints so they fall between the nailing channels in each succeeding course. Panels are attached to the nailing channels at each bearing with a 1⅛" annular steel nail, spaced approximately 6" on center. Diameter of nailheads shall be approximately ⅜". Staggered end joints of the nailing panels shall be reinforced by inserting a 20-gauge steel bridging clip at each intersection.

FOR INFORMATION on the availability of new Armstrong Fire Guard Nailing Panel contact your Armstrong District Office or write direct to Armstrong, 4200 Richard Road, Lancaster, Pa.

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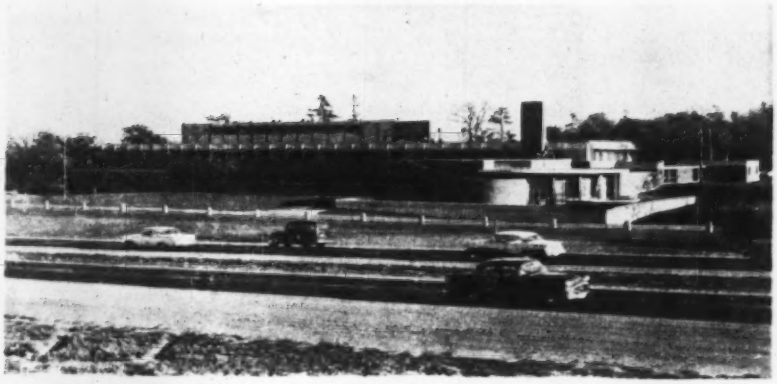
Armstrong FIRE GUARD NAILING PANEL



OWRC's new research lab also does routine water and sewage analysis.

them available to municipalities and persons.

• To construct, acquire, provide, operate and maintain sewage works to receive, treat and dispose of sewage delivered by municipalities and persons.

• To conduct research programs.

The Commission has supervision of all surface and ground waters used as a source of water supply. OWRC keeps check on these waters to determine what, if any, pollution exists and pinpoints the causes.

No new municipal water supply or sewage works, or additions to existing works may be undertaken without Commission approval.

OWRC investigates all cases of pollution, traces them to the source and the offender—industry, municipality or individual is urged to correct the situation.

In pollution violations, OWRC "advises" the polluter on how best to avoid the pollution. The violator is free to proceed on his own, but proceed he must, or risk stiff fines and jail sentences.

OWRC is in no way involved in a give-away program. Mr. Berry explains, ". . . we only lend the municipalities the money. The borrowing powers of the Province of Ontario are greater than those of small communities, and we can, therefore, obtain lower interest rates. Loans are repayable over extended periods . . . mostly on 30-year terms. Financial arrangements also make possible deferment of initial capital payments."

OWRC will completely finance a sewage or water works for any municipality or group of municipalities that requests it. But there is one string, and this is what makes the operation unique:

Once a community agrees to build under OWRC auspices it becomes more than just indebted financially. Part of the deal is that the facility, when completed, will be operated by personnel selected, trained, and employed by OWRC. The municipality involved reimburses the Commission for the operators' salaries while retiring the capital debt.

Since its active start in the construction field in 1957, OWRC has put into operation, is constructing, or has agreed to undertake, 175 water or sewage projects for 134 Ontario municipalities. These have an estimated value of $71.9 million, of which sewage accounts for $52.6 million and water, $19.3 million.

So far this year, the Commission has built more than $14 million worth of water projects and $30 million worth of sewage projects.

• **How it works**—There are those at OWRC's headquarters who would suggest that the first prerequisite is to have Albert Berry as general manager and chief engineer.

General Manager Berry is the top administrative officer, answering directly to the commissioners. He heads all the standard administrative branches, personnel, accounting, public relations and others.

But Chief Engineer Berry is at the helm of a divisional organization that "covers the waterfront." There are divisions of sanitary engineering, construction, plant operations, laboratories and research, and water resources.

When OWRC was created, one of its first jobs was to assume many of the responsibilities of the provincial health agencies. The two main functions of the Sanitary Engineering Division are the elimination of pollution and the supervision of the province's water supplies.

Within this over-all program, the Division takes part in the design and inspection of all projects with which the Commission is associated. The major work of the divisional field staff is the inspection of existing water and sewage plants, commission-run or otherwise.

In addition, Sanitary Engineering

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carries out stream and pollution surveys and approves municipal plans for proposed water and sewage projects, regardless of whether the town is building its plant in conjunction with the commission.

• **Construction procedures**—OWRC's Construction Division functions as a top-level supervisory section, but it does not actually build. The municipalities handle the construction while OWRC oversees and finances the projects.

A municipality that has decided to build engages a consulting engineering firm to design the project. The town and the consultant then present the proposed project to OWRC for approval. If it meets OWRC standards, the project may be built.

At this time the municipality may request Commission assistance in carrying out the construction program. If it does, OWRC's Construction Division takes over.

The consultant supplies a resident engineer to run the job. But he is subject to periodic inspection visits by one of the OWRC's eight construction engineers.

Each OWRC engineer usually has about a half-dozen projects under his jurisdiction at once. Although the Construction Division does not usually contract out work on its own, it will deal directly with contractors at certain times. For example, the resident engineer cannot pass on contractors' extras; the OWRC man approves these.

• **Plant operation**—The Plant Operations Division operates and maintains plants financed by the commission.

Division project engineers maintain liaison between OWRC headquarters and the individual projects. These men, usually sanitary engineers, rove from project to project overseeing general operations, advising plant operators, and referring major problems to the front office. Each project engineer usually handles between 15 and 20 projects.

The division's field technicians follow the construction of a project, checking on installation of equipment and developing a system of maintenance and mechanical inspection to guide plant operators.

One of the most important functions of the division is training staffs for the plants OWRC builds. "It is obvious that if efficiency and economy are to be obtained those responsible for the operation and administration must be well trained," says Mr. Berry.

Not only does OWRC train operators for its own plants, but it will also train men for any municipality or industry in the province. The commission's prime concern is that well trained, intelligent men run all waste treatment plants.

OWRC tries to recruit operators in the locality where a plant is built and starts with inexperienced people almost exclusively. These men are easier to train and there are no problems of breaking them of bad habits developed somewhere else.

The training program consists of three, one-week courses. These are combined with on-the-job training and followed by supervision by OWRC personnel for the first year on the job. Presently, OWRC has 135 trained operators working at plants around the province.

Although OWRC is responsible for the management, operation and control of all the projects it constructs for municipalities, it maintains close cooperation with the municipality through local advisory committees.

OWRC's Plant Operations Division meets regularly with the local groups in order to discuss such items as project expense, wage rates, working conditions, and personnel.

Plant Operations expects to collect valuable data on operating and maintenance using a variety of equipment. All plant operators submit regular reports to headquarters, where the information is carded for ultimate analysis by computer.

• **Laboratory's research** – Last year, OWRC opened a modern laboratory and research center. One of the major programs at the lab is routine water sampling and water testing, as well as examination of sewage and industrial waste specimens. The lab's biology section studies the effect of pollution on life in the province's many lakes and rivers.

The laboratory carries out extensive research, especially in the realm of industrial waste treatment. It is commission policy to give every assistance to industry in solving waste problems. Ontario's municipalities get all laboratory services free of charge.

• **Water Resources Division**—Since 35% of Ontario's population depends on groundwater as a source of water supply, the Water Resources Division plays an important role in the commission's work.

It continually collects groundwater information and related geological data from well driller's reports, observation wells, and staff field surveys. The groundwater branch will advise municipalities and others on where to drill a well and will even supervise test drilling.

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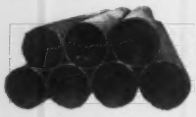

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Durable "Defense-in-Depth" paint stays like new through long Maine Winter

Interrupted job on big Kennebec Bridge shows how Basic Lead Silico Chromate pigment combines outstanding weather resistance with rust inhibition.

On Maine's mile-long double-decked Kennebec Bridge – during a recent severe Winter—"Defense-in-Depth" was proved to be no catch-phrase.

Which coat is the fresh coat? Half the bridge received its finish coat in the Fall, after spot priming—and an intermediate coat where necessary. Then the job waited out the Winter. When the finish coat was completed on the other half in Spring, it was hard to tell the difference between the two sections. The half painted the previous Fall had not weathered noticeably.

Rust inhibition, weather resistance and durability . . . all three advantages are combined in paints containing *M50*® Basic Lead Silico Chromate pigment. All three properties can be provided in *every* coat—primer, intermediate and finish. This is "Defense-in-Depth"—anti-rust action that goes from the primer up through the finish coat, plus durability that goes from the finish down through the primer.

Now used by 11 states for bridges and structures, *M50* pigment is proving these and other benefits. It restricts underfilm rust creepage. It's tintable—with a low color strength permitting high pigmentation in almost all shades. To get more helpful information, simply write to National Lead Company.

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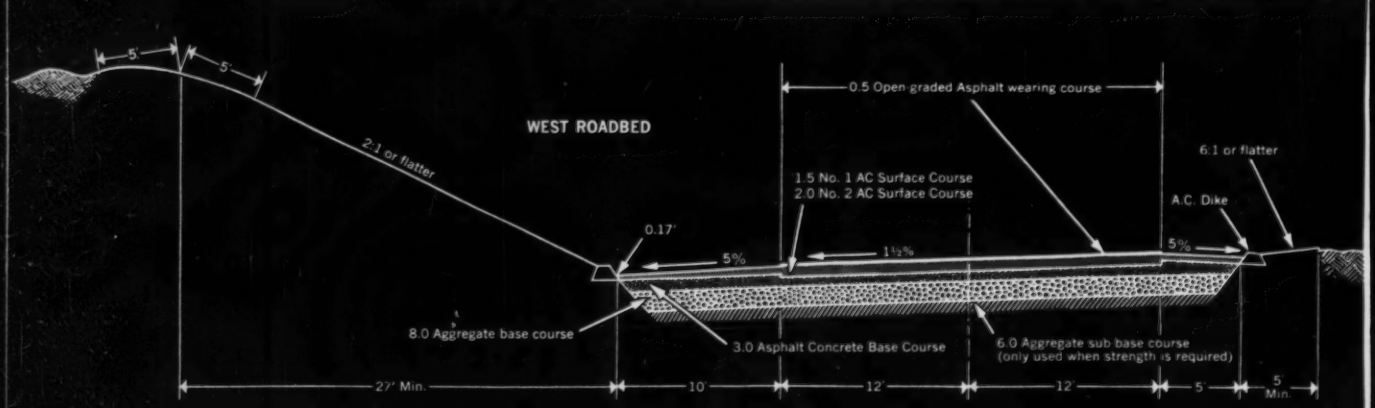
FINISHED ROADWAY on California Interstate Highway 15. Asphalt dikes and embankment on right show unusual drainage design to combat flash floods in Baker Sink region of high Mojave Desert plateau.

ASPHALT DIKES on shoulder edges direct surface water to drainage outlets.

STONE CRUSHERS make use of local aggregate found at site to offer California taxpayers important savings.



CALIFORNIA HIGHWAY ENGINEERS SPECIFY DEEP STRENGTH ASPHALT CONSTRUCTION

Asphalt dikes and ditches to divert Mojave Desert flash flood water from Interstate Highway 15.

California's largest asphalt pavement highway contract used local aggregate crushed on site resulting in substantial economies.

For the 25.2-mile four-lane, divided limited access section of California Interstate Highway 15 that replaces U.S. Route 91 from 1 mile east of Baker, California, to 1 mile east of the Cima Road, engineers of the California Division of Highways chose the Advanced Design Criteria for modern DEEP STRENGTH Asphalt Construction.

Natural Obstacles . . . Location in southeastern California on the high eastern Mojave Desert plateau, with elevations from 1,000 to 4,000 feet, posed some unusual design problems. Temperatures range from 115° in summer to 25° in winter, rainfall averages only 4¾ inches annually (which usually occurs as hard downpours).

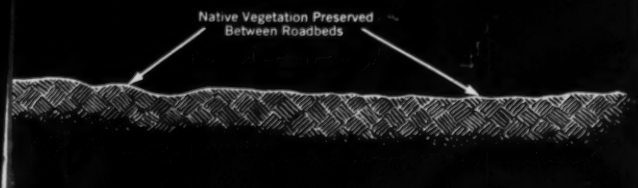
Flash floods occur because rainwater reacts with minerals in the dry sand to form an impervious crust. The resulting rapid surface run-off must be controlled to prevent undermining of the roadway. California Division of Highways through many years of study has developed an effective solution to these unique drainage problems by use of diversion ditches and dikes.

DEEP STRENGTH Design . . . The cross section below shows how California engineers made use of the principles of DEEP STRENGTH Asphalt Construction. Note 4" surface and wearing courses with 3" asphalt-concrete base course. The 8" aggregate base and 6" subbase (where necessary) consist of *water-bound* layers of 1½" max. stone compacted with pneumatic rollers and steel tandem rollers. The 8" aggregate base is primed with 0.25 gal. per sq. yard of SC-2 before asphalt-concrete base course was spread. Total thickness is 15 inches to 21 inches depending on the subsoil.

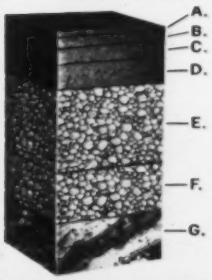
A median 90 ft. wide was used, with no treatment. (The crust and scant vegetation on median surface was kept intact to minimize erosion during periods of high surface run-off and/or wind.) Outside shoulders are 10 ft. wide and paved. Inside shoulders have 2 ft. paved and 3 ft. unpaved. (In cut sections, 5 ft. wide, all paved.)

Taxpayer Saving . . . DEEP STRENGTH Asphalt Construction allowed California's engineers to use local aggregate crushed at the site. This, plus the inherent economy of Asphalt Construction, results in important savings for the taxpayer of California. And low future maintenance costs on DEEP STRENGTH Asphalt will provide additional tax savings.

THE ASPHALT INSTITUTE College Park, Maryland



THIS IS DEEP STRENGTH DESIGN ON CALIFORNIA INTERSTATE 15



A. Wearing Course	0.5
B. No. 2 AC Surface Course	1.5
C. No. 1 AC Surface Course	2.0
D. Asphalt Concrete Base Course	3.0
E. Aggregate Base Course	8.0
F. Aggregate Subbase	6.0
G. Subgrade or Improved Subgrade	—
TOTAL MAXIMUM THICKNESS	21.0

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Two timber deck bridges priced for . . .

Ohio Road Construction Job

Two timber deck steel beam bridges with concrete abutments—one 24 ft and one 48.5 ft span—account for 80% of the cost of this 990-ft highway job in Brown County, Ohio. Both new bridges will have 32-ft roadways compared with the 13 and 16-ft-roadway structures they replace.

The award went to The Murray Construction Co., Waverly, Ohio, for $98,677 when the lowest bid, $94,819, proved irregular. Murray was 9.1% under the second low, Chas. S. Ratzlaff Construction Co., McArthur, Ohio, 19% under the high of six bidders, and 9.6% below estimate. A. M. Kinney, Inc., Cincinnati, is the engineer on this job for the Department of Highways.

The job includes grading, draining, and paving with asphaltic concrete on an aggregate base as well as construction of the two bridges.

Asphaltic concrete surface course, 80 cu yd (type C 85-100), and asphaltic concrete leveling course, 101 cu yd (type 85-100), both moved from a low unit price of $25.00 to a high of $34.00 a yard.

Aggregate base course ranged from $8.00 to $11.50 a yard for 260 cu yd, and subbase from $4.00 to $9.80 a unit for 203 cu yd.

Reinforcing steel, 14,768 lb, went from a low of $0.12 to a high of $0.14 a unit, and structural steel, 16,100 lb, from $0.15 to $0.175 a lb.

Unclassified excavation ranged from $4.00 to $6.00 a cu yd for 278 yards, rock excavation from $12.00 to $30.00 for 73 yards, channel excavation from $0.80 to $1.00 for 2,732 yards, and roadway excavation ranged from $1.00 to $1.80 for 1,347 cu yd. Borrow ran from $1.00 to $1.70 a unit for 770 cu yd.

Class E concrete for the 24 ft span's abutment walls ranged from $45 to $70 a unit for 165 cu yd, and for abutment footings, from $33 to $60 for 139 yards. For the 48.5 ft span's abutment walls, concrete prices moved from a low of $46 to a high of $70 for 177 units, and for footings from $35 to $60 for 121 units.

Base wage rates in the Brown County area include: common, $3.025/hr; carpenters and structural ironworkers, $3.95; steamfitters, $4.10/hr.

The bidding included:

1C	The Murray Const. Co., Waverly, Ohio	$98,677
2	Chas. S. Ratzlaff Const. Co., McArthur, Ohio	108,543
6	W. J. Seidensticker Co., Columbus, Ohio	121,626
EE	A. M. Kinney, Inc., Cincinnati, Ohio	109,200

Bids: 5-9-61 Items	Unit	Quantity	Unit Prices 1C	2
Roadway				
Excavation	cy	1,347	$1.50	$1.00
Borrow	cy	772	1.50	1.00
Subgrade, compacted	sy	1,409	0.20	0.20
Trees & stumps, remove	ls	job	1,000	2,500
Water	Mgal	19	5.00	1.00
Rail, guard, steel beam, std tp, deep	lf	300	3.20	4.00
Seed & protect	sy	8,000	0.12	0.10
Fertilizer, commercial	t	0.76	125.00	100.00
Liming mat, agricultural	t	3.8	22.00	20.00
Sodding	sy	410	1.50	1.00
Caldium chloride, maint traffic	t	7.5	60.00	10.00
Aggr. traffic comp surf crse, maint traffic	cy	382	4.00	2.00
Drainage				
CMP, plain, driveways, 12"	lf	88	3.40	4.00
Sew, storm, cl B, 6"	lf	50	2.60	1.00
CMP, helical, w/out perf for outlets rdwy drain, 6"	lf	50	1.50	2.00
Drainage, rdwy, 6"	lf	50	1.25	1.00
Underdrains, stone, #2	lf	400	1.00	1.00
Rock channel protect, dump	cy	19	10.50	8.00
Pipe, remove, 15" & under	lf	20	0.25	2.50
Pavement				
Asph conc, surf crse, tp C 85-100	cy	80	25.00	25.00
level crse, 85-100	cy	101	25.00	25.00
Bit prime coat	gal	634	1.00	0.40
Aggr base crse	cy	260	8.65	8.00
Subbase	cy	203	8.65	4.00
Structures over 20-ft span				
Bridge 1				
Cofferdams, cribs, sheet	ls	job	1,500	300.00
Excavation, uncl	cy	124	4.00	6.00
rock	cy	206	12.00	8.00
channel	cy	917	1.50	1.00
Conc, cl E, abut walls	cy	165	48.00	60.00
footngs	cy	139	48.00	60.00
Waterproofing, premld seal strip	lf	26	4.00	5.00
Steel, reinf	lb	14,768	0.12	0.14
str	lb	16,100	0.1565	0.1600
field painting	lb	16,100	0.01	0.01
Flooring, strip, creosoted, 6"	sf	867	2.50	3.00
Railing, steel	lf	53.54	10.60	10.00
Run-around, temporary, bri & approaches	ls	job	2,780	2,500
Remove, exist str	ls	job	1,000	1,000
Backfill, porous	cy	82	6.00	8.00
Bit tack coat	gal	15	1.00	1.00
Asph conc surf crse, tp C, 85-100	cy	6	25.00	25.00
Rock, channel protect, dumped	cy	91	8.50	8.00
Bridge 2				
Cofferdams, cribs, sheet	ls	job	1,500	3,000
Excavation, uncl	cy	278	4.00	5.00
rock	cy	73	12.00	10.00
channel	cy	2,732	1.00	1.00
Conc, cl E, abut walls	cy	177	49.00	60.00
footngs	cy	121	49.00	60.00
Waterproofing, premld seal strip	lf	26	4.00	5.00
Steel, reinf	lb	13,212	0.12	0.14
str	lb	61,500	0.1565	0.1600
field painting	lb	61,500	0.01	0.01
Floorng, strip, creosoted, 3"x6"	sf	1,698	2.50	3.00
Railing, steel	lf	105.8	10.50	10.00
Run-around, temporary, bri & approaches	ls	job	2,690	3,500
Remove, exist str	ls	job	1,000	2,000
Backfill, porous	cy	66	6.00	8.00
Bit tack coat	gal	29	1.00	1.00
Rock, channel protect, dumped	cy	301	10.50	8.00
Asph conc surf crse, tp C, 85-100	cy	11	25.00	25.00
Premium, Ind. Insurance	ls	job	300.00	400.00
Traffic maint, incl lgts, signs, barricades, watchmen, 24-hr service	ls	job	200.00	800.00

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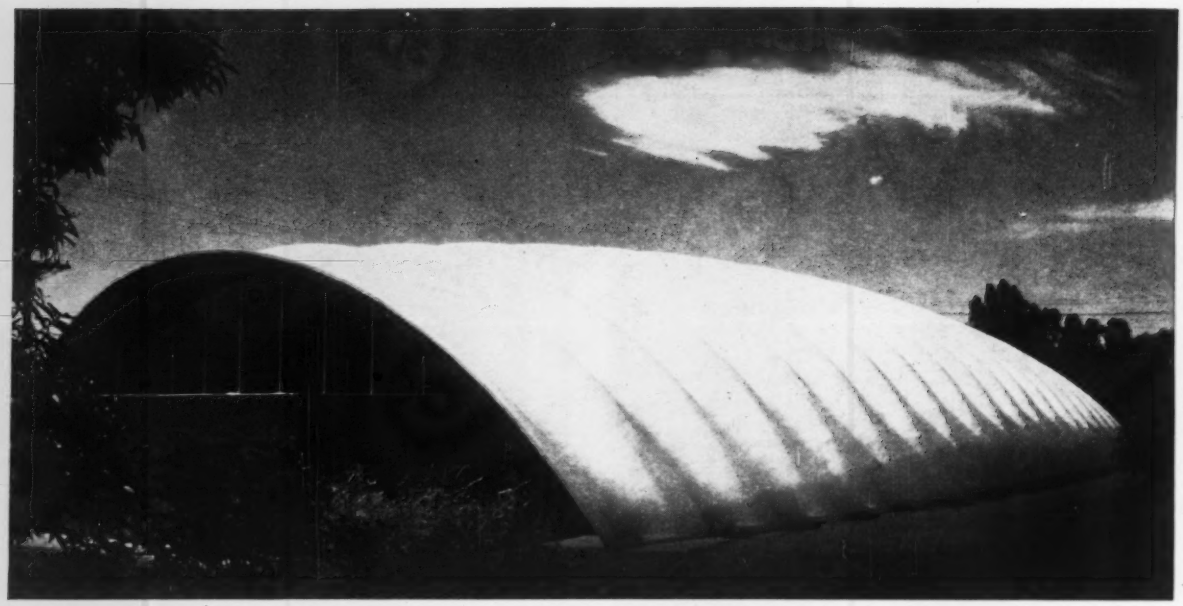


36 HALF-ARCH CONCRETE SECTIONS, site-cast then crane erected and tied by welded plates, form clear span, armadillo-shaped ice rink in Tarzana, Calif.

Thin shell concrete toroid houses skating rink

A CORRUGATED TOROID of reinforced concrete, the first such structure in America, proved to be an economical as well as unique enclosure for a California ice rink. The 4″ thick shell has a 100′ x 180′ base and is made up of 36 sections, cast on site. Arch of the toroid tapers from 32′ at center to 24′ at ends.

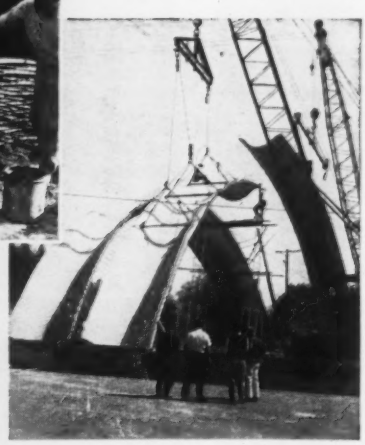
Each 10′ wide half-arch is corrugated and curved in two directions. Its base rests on a 20″ dia. x 23′ deep concrete pile, poured in place. Welding plates, cast into the centerline end, were welded to their companion sections.

Double curvature of the panels ruled out conventional forming. Casting pit was formed with an arched mound of earth left in the center. This mound was shaped into four beds, surfaced with concrete and plastered smooth. Nine progressively shorter panels were cast atop each other in each bed.

The problem of over-slumping in the concrete was solved after several trial mixes. The answer was a mix of $\frac{3}{8}$″ top size aggregate with additive for workability. Compressive strength was 3,000 lbs. at 7 days.

Shell and foundation cost only $19,000. Total construction costs were $103,000, little more than $6 per sq. ft. Concrete was delivered to exact specification by truck mixers of certified design, capacity, mixing speed and water control accuracy.

PANELS WERE CAST in pancake stacks in four sculpted earth beds. Inserts for strongbacks were placed with reinforcing steel.



CRANES POSITIONED both panels of each arch and butted them for welding. After all panels were erected, dowels spanning 16″ wide pour strips between panels were spliced and welded. The pour strips were gunited to follow the contours of the shell. Contractor: Rains-McLellan Corp. Architect: Carl Maston, AIA. Structural engineer: Richard R. Bradshaw

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Materials Prices

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- Wood Products, Glass, Explosives, Chemicals: Last, Sep. 21; Next, Oct. 19.
- Clay Products, Limes, Plaster, Paint, Roofing: Last, Sep. 28; Next, Oct. 26.
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Cement, Port., bulk	CL	bbl.	$3.69a	$3.91a	$3.50ef	$4.53ap	$4.02ag	$4.34c	$3.89	$3.46a	$4.39a	$3.91agq	$3.97a	$3.71c	$4.17a	$3.65b	$4.20a	$4.01¢ae	$4.62bj	$4.09a	$3.85c	$3.75ag	$2.96def	$3.84t
paper	"	"	4.32a¢	4.42a	4.43c	5.83ip	4.52ag	4.90c	4.77¢	3.90a	4.89a	4.24a	4.30a	4.15c	4.68a	4.17b	4.71a	4.51¢ae	5.65bjk	4.59a	4.42c	4.47¢a	3.26¢de	4.00i
mortar	"	"	3.64a¢	3.56a	.....	4.90imp	4.15g	4.32c	4.19¢ae	3.78a	4.89	3.29a	4.52a	4.65c	4.26a	3.97b	3.77a	3.63¢e	5 00bjl	4.24a	4.86c	4.65a	3.31¢de	4.00i
Gravel, 1½"	"	ton	2.25a¢	2.80a¢	2.65ns	3.00qsz	3.78¢e	2.29¢cu	2.25ae	2.55¢a	1.95	2.50¢abm	.....	2.56¢at	2.70¢ae	2.61b	.....	1.95¢a	2.68¢aqv	3.50¢as	2.02	4.25¢bm	1.90¢a	2.40
¾"	"	"	2.50a¢	2.80a¢	2.65ns	3.00qsz	3.78¢be	2.34¢cu	2.25ae	2.60¢a	2.15¢	2.50¢abm	.....	2.71¢at	2.70¢ae	2.61b	3.20bk	1.95¢a	2.68¢aqv	3.50¢as	2.02	4.25¢bm	2.15¢a	2.40
Sand	"	"	2.00a¢	2.25a¢	2.13ns	3.00qsz	4.13¢be	2.44¢cu	1.75ae	1.65¢	1.42¢b	2.16¢abm	1.70¢a	2.41¢at	1.60¢ae	2.16¢b	2 30bkw	1.55¢a	3.08¢aqv	2.50 3.50¢as	2.12	4.25¢bm	2.40¢a	2.05
Crushed stone, 1½"	"	"	3.10s	2.85a¢	2.75s	1.75qsz	3.95¢be	2.55¢cu	2.70fy	2.57	.....	2.80¢abm	2.10¢a	2.41¢at	4.00¢ae	.....	2.85blbb	2.00¢a	2.00¢aqv	1.75js	2.17	4.50¢bm	1.90¢	2.40
¾"	"	"	3.10s	2.90a¢	2.75s	1.85qsz	3.95¢be	2.74¢cu	2.70fy	2.77	3.00¢x	2.80¢abm	2.10¢a	2.46¢at	4.00¢ae	.....	2.85blbb	2.30¢a	2.00¢aqv	1.75js	2.17	4.50¢bm	2.15¢	2.40
Crushed slag,* 1½"	"	"	3.90r	2.05a¢	1.95d	.....	2.25¢e	1.80u	2.30¢f	.....	.....	3.15aqaa	.....	.....	.....	1.95d	.....	2.25¢a	2.10w	1 80	.....	.....	2.00	2.40
¾"	"	"	3.90r	2.00a¢	2.05d	.....	2.25¢e	1.80u	2.30¢f	.....	.....	3.50aqaa	.....	.....	.....	2.05d	.....	2.35¢a	2.10w	1.85	.....	.....	2.00	2.40
Concrete block, 8"x8"x16"																								
Sand gravel	TL	ea	0.19o	0.18a	0.19	0.24o	0.26¢e	0.19o	.....	.....	0.25	0.24u	0.22a	0.145f	0.20q	0.25r	0.276no	.....	0.22rx	0.26¢o	0.24	0 288s	0.20	0.26
Lt. wgt. agg	"	"	0.225o	0.18a	0.19	0.305ao	0.26¢be	0.25ao	0.24f	0.255	3.27ao	.27¢au	0.27c	0.225	.....	0.25	0.32bo	0.20	0.22rx	0.32¢co	0.28el	0.384cs	0.28t	0.30cu
Concrete, ready-mix'r		cy	13.00g	13.50ou	14.75q	15.00q	13.00-13.50e	15.00gr	16.95u	11.50x	11.90	15.50eaa	13.50	12.46hlx	14.55f	14.25o	17.60ay	14.65z	16.15o	13.65/14.10q	13.25cw	14.70j	10.80ek	11.75q

¢ Delivered. * F.o.b. plant. ** Add 4% sales tax ¢¢ Add 2% Intrastate sales tax. R Revised. † Plus 6% Mun & Prov tax.

CEMENT: *a Less 10¢ disc. 15 days. *b Less 2% disc. 15 days. *c Less 10¢ disc. 10 days. *d 10¢ disc. 20 days. *e Truckload lots. *f Fob mill, add $14.58 to $21.31 per car switching charges. *g fob mill + freight. *h LCL. *i Less 2% disc. 10 days. *j Truck lots, fob yard. *k 100 bag lots. *l over 150 sacks. *m Sold in bags only. *n Less 5% disc. 30 days. *o Plus 50¢ for Sat. del. *p 5-8 ton truckload. *q F.o.b. mill *r 50 cy & over *s In bags & bbl. Only. *t min. 7 tons

SAND, GRAVEL, STONE & SLAG: *a Truck lots. *b Per cu. yd. *c 5 tons up. *d Less 5¢ disc. 10 days. *e Less 2% disc. 10th. *f Less 2% disc. 15th. *g Less 5% for cash. *h Less than 5 tons. *j F.o.b. quarry. asd. *i F.o.b. scow Hudson river. *m Less 2% for cash. *n F.o.b. cars. *o F.o.b. yard. *r less 5% disc. 15th. *s Less 2% disc. 10 days. *t Less 10¢ disc. 10 days. *u Less 5¢ disc. 10 days. *v Less 2% disc. 15 days. *w Less 10¢ disc. 15 days. *x Incl. 35¢ switch charge. *y F.o.b. dock. *z 5-8 tons. *aa Less 5% disc. 15 days. *bb Less 2% 25th of month

CONCRETE BLOCK: *a Cinder. *b Waylite. *c Haydite. *d Celocrete. *e 5¼ x 8 x 12 in. *f 8 x 4 x 16 *g F.o.b. truck at job. *i F.o.b. plant San Rafael. *m F.o.b. yard. *n 8 x 8 x 18. *o Less 2% disc. 10 days. *p Less 2% disc. 10th. *q Less 5% disc. 10th. *r Less 2% disc. 15 days. *s Less 2% disc. cash. *t Siporex, 7 x 8 x 18. *u Less 5% disc. 10 days. *v Less 12% disc. 15th.

READY MIXED CONCRETE: *a 6 cu yd or over del. Man. *b 25 cu yds or more. *c 10-100 cy. *d 1-3 mi. zone add 15¢ for ea. add'l 1-mi. zone. *e 3,000 lb comp. *f 2,500 lb. comp., less 5% disc. 30 days. *g Less 25¢ disc. 15 days. *h Less 50¢ for cash. *i 5% off for cash. *j 2% off for cash. *k Federal tax included. Add 6% mun. & prov. tax. *l 1:2½:3½ base price. *m F.o.b. yard. *n Plus escalator clause. *o Less 2% disc. 15 days. *p Less 50¢ disc. 15 days. *q Less 2% disc. 10 days. Add 50¢ per zone. *r 2000 wgt. *s Less 5% disc. 10 days. *t Incl. 50¢ heating. *u Less 2% disc. 15th. *v Sat. del. +50¢. *w 10-100 cy. *x Del in zone 20-B. *y less 25¢, 10 days. *z less 1% in 30 days. *aa 6 bag mix

MILL PRICES FOR BULK CEMENT: Subject to 10¢ discount, 15 days. For paper bags add 50¢ per bbl., not refundable. *Prices guaranteed through December 31, 1961*

Richard City, Tenn	$3.55	Bath, Pa	$3.50	Northampton, Pa	$3.50	Leeds, Ala	$3.40	Howes Cave, N. Y.	$3.50	Oswego, N. Y.	$3.60	Green Bay, Wis	$3.60
Clinchfield, Ga	3.55	Lesley, Pa	3.50	Universal, Pa	3.60	Duluth, Minn	3.60	Muskegon, Mich	3.55	Cleveland, O	3.65	Ironton, O	3.65
Kingsport, Tenn	3.55	Buffington, Ind	3.55	Waco, Tex. (+ 10 tax)	3.35	Hudson, N. Y.	3.50	Saginaw, Mich	3.60	Alsen, N. Y.	3.50	Montreal, Canada (a)	2.80
West Des Moines, Iowa	3.65	Independence, Kan	3.35	Giant, S. C.	3.55	Alpena, Mich	3.50	Wyandotte, Mich	3.60	Toledo, O	3.60	W. Winfield, Pa	3.60
Nazareth, Pa	3.50	Hannibal, Mo	3.55	Steelton, Minn	3.60	Detroit, Mich	3.60	Buffalo, N. Y.	3.55	Milwaukee, Wis	3.60	Security, Md.	3.50

*a 350 lb. bbl.

PAVING BRICK, BLOCK, ASPHALT, ROAD OILS - F. O. B. CITY

Item	Quantity	Unit	Atlanta	Baltimore	Birmingham	Boston	Chicago	Cincinnati	Cleveland	Dallas	Denver	Detroit	Kansas City	Los Angeles	Minneapolis	New Orleans	New York	Philadelphia	Pittsburgh	St. Louis	San Francisco	Seattle	Montreal	Toronto
Paving brick, block-																								
Brick, 3"x4"x8½"	CL	M	.....	.....	.....	.....	$150.00¢ab	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	$60.00k	.....	.....	.....	.....	.....
Granite, 4"x4"x8"	q	M	.....	.....	$66.00i	.....	95.00¢a	.....	89.50	40/80	62.00a	$114.00	.....	.....	.....	.....	.....	.....	95.00n	.....	$70.00	.....	.....	$120.00¢
Wood, 3½" 16 lb	...	sy	.....	.....	.....	.....	3.95/4.00aj	.....	6.30	.....	.....	.....	.....	.....	.....	.....	$3.70f	.....	6.35n	.....	.....	.....	.....	4.50f
Asphalt, paving																								
Tank car	CL	ton	$0.1182W	$21.00	25.12 O	$22.00apS	22.00b	$26.00SU	24.00tA	26.90	.....	31.00¢	$18.75el	$18.00dmx	23.70	$20.00e	22.90mO	0.21u	31.20isv	$19.74	22.50gdd	$24.00s	$30.50n	38.90
Drummed	CL	gal.	0.1220W	.....	25.69	46.00apS	32.00b	.....	.....	46.35	.....	.....	.....	.....	.....	.....	67.83mO	.....	.....	21.65	41.00gdd	47.00h	43.60u	59.01ee
Asph. binders, fluxes																								
Tank car	CL	gal.	0.1182W	0.9i	0.1069	22.00avS	20.40bv	26.00ffv	24.00tvA	.1138	.....	31.00¢	18.75cv	18.00dvx	23.70	20.00ev	22.90vtO	0.21u	31.20isv	.1825f	22.50gkvdd	33.00vsec	0.167n	0.2135ee
Drummed	CL	gal.	0.1220W	0.18i	0.1093	46.00avS	30.40bv	.....	.....	.1983	.....	.....	.....	.....	.....	.....	67.83vtO	.....	.....	.1825	40.00gkvdd	38.50	0.211n	0.2367w
Asph. cutback, MC																								
Tank car	CL	ton	0.1222W	0.9i	0.1163w	0.105awF	.10bwH	0.1165twAF	0.1050wSU	30.50	.....	30.24wl¢	.0825ewJ	19.50dKx	0.105w	0.095ew	10.16uF	0.095U	0.1403¢S	.09f	22.50gNdd	25.50KE	17.80nuE	0.18wee
Drummed	CL	gal	0.1258W	0.18wE	0.1188Ow	0.22awF	.18bwH	.....	.....	52.45	.....	.....	.....	.....	.....	.....	29.62uF	.....	.....	.092fw	46.50gNdd	.....	22.20nuE	0.235
Road oil, tank car	CL	gal	.....	0.95i	0.1006O	0.14aOR	.08b	0.109	.....	.1100	.....	27.84v	.06751c	18.50dvaa	0.95	0.085eB	.....	0.095U	0.14¢S	.165f	23.25gvWdd	28.75hvY	0.155n	0.191w
Asph. emul. RSI																								
Tank car	CL	gal.	0.1288W	0.10i	0.1069	0.15OR	.....	0.1265	.....	0.1138	.....	0.152	.10	21.40jXv	0.137bb	0.095eBL	10.15u	.....	0.1403i	.18250	23.50gvXdd	25.80hvX	0.242n	0.204Zee
Drummed	CL	gal	0.1327W	0.19i	0.1093O	.....	.....	.....	0.21A	0.1983	.....	0.29	.....	.1842jXv	.....	0.1905eB	29.81u	.....	.....	.30	.2023gXdd	49.80hrvX	0.27nX	.26Zee

PAVING BRICK & BLOCK: *a Less 2% disc. 10th. *b 3 x 3½ x 8. *c 2½ x 8 x 4. *d Truckload lots. *e Not used. *f 2" interior 6 lb tr. *g Less $1./Mdisc. 15th. *h 2" tr. 8 lb. *i 3 x 3½ x 8½. *j 2½", 6 lb. tr. *k Used. *l Redshale. *m Pine; oak $6.57. *n Truck del. *o Less $1 M disc. 15 days. *p Used: $40; new: $80. *q Lots of 50M.

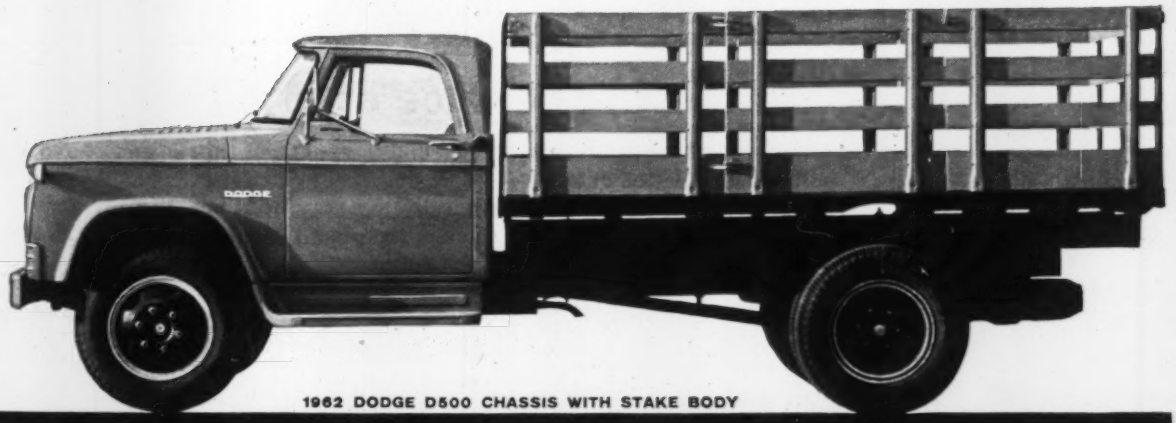
ASPHALTS: *a F.o.b. refinery, Everett, Mass. *b F.o.b. refinery, Lockport, Ill. *c F.o.b. Sugar Creek, Mo. *d F.o.b. refinery, El Segundo. *e F.o.b. Baton Rouge. *f F.o.b. Hartford, Ill. *g F.o.b. refinery, Richmond, Calif. *h F.o.b. Martinez. *i F.o.b. refinery, Baltimore. *j F.o.b. refinery, Inglewood, Calif. *k 50-110 'penetr. *l Less than 100 penetr. *m 40/300 penetr. *n F.o.b. refinery, Montreal. Fed. tax included; add 6% for mun. & prov. *o Drums not avail. Shipped in steel bbl. *p 60/70 penetr. *r In customer's drums. *s Shipped in drums, per drum. *t 150/300 penetr. *u Per 100 gal. *v Per ton. *w Per gal. *x Also tank trucks *y F.o.b. Oakland. *z F.o.b. Edmonds. *A F.o.b. refinery, Cleveland. *B F.o.b. Destrehan, La. *E RC. *F Also RC. *G Also MS *H RC 0-5 incl. *I MC 4. *J MC, RC $0.095. *K MC 3, 4, & 5. *L MS. *M MC 1-5, RC 1-5, $0.0918. *N MC 3. *O Truckload. *P F.o.b. refinery, Atlanta. *Q F.o.b. Eldorado, Ark. *R Delivered within 50 mi. *S Less 2% disc. 10 days, net 30. *T Less 1% disc. 10 days. *U F.o.b. refinery. *V Less 2% disc. 15 days. *W SC 2. *X RS 1. *Y SC 1. *Z Incl. 10% Sales Tax. *aa SC 3, 4, & 5. *bb RS 3. *cc In used drums. *dd less disc of $1 ton. *ee 45 Imp. gal. drums *ff 60-150 penetration

1962 DODGE HALF-TON PICKUP

ANNOUNCING THE 1

FROM 1/2-TON PICKUP TO DIESEL POWER, Dodge trucks for 1962 feature more than 50 engineering advances to make them tougher, more tight-fisted. ■ And they're on display right now at your Dodge dealer's, priced to compete with every full-size truck rolling the road. ■ Whatever your trucking job, there's a tough Dodge to do the job better, faster, more economically.

1962 DODGE W200 4-WHEEL-DRIVE SWEPTLINE PICKUP



1962 DODGE D500 CHASSIS WITH STAKE BODY

962 DODGE TRUCKS

Advancements include new axles, transmissions, steering gears, diesel engines, and electrical components. ■ Every gasoline-powered model has a 35-amp alternator as standard equipment for faster, surer starts in all weather. ■ See and drive the 1962 Dodge trucks at your dependable Dodge dealer's.

DODGE BUILDS TOUGH TRUCKS

1962 DODGE CT800 GASOLINE-POWERED TANDEM DUMP

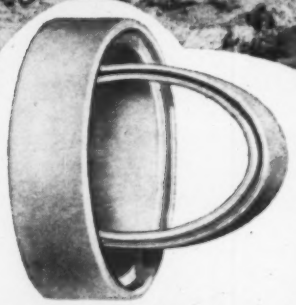
PRECAST CONCRETE SEWER ELEMENTS

for lasting service at low cost

American-Marietta offers concrete manholes and a variety of pipe styles—each precast for faster installation at less cost—each designed to do a specific job better. A-M Concrete Products plants are strategically located throughout the country to assure quick delivery. Write for the name of the plant nearest you and ask for free literature on any of the products illustrated below.

HI-HED® PIPE

Saves trench width in congested areas



INNER CIRCLES®

Minimizes surface excavations, makes salvaging of old sewers easier

LO-HED® PIPE

Minimum depth of cut—affords increased cushion of cover

CONCRETE PIPE

Strengths pretested to eliminate guesswork

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CONCRETE PRODUCTS DIVISION

GENERAL OFFICES:

AMERICAN-MARIETTA BUILDING

101 EAST ONTARIO STREET, CHICAGO 11, ILLINOIS, PHONE: WHITEHALL 4-5600

Bid Asked—Low Bidders—Contracts Awarded—

NEW ENGLAND

BUILDINGS—LB & CA

▲ **Grande & Son, Inc.,** 175 Maplewood St., Malden, Mass., LB **$3,092,839,** est. $3,500,000 (6 bidders), SENIOR HIGH SCHOOL ADDN., WOBURN, MASS. City, City Hall, 10 Common St., Woburn, Mass. R. G. Vanderweil, 183 Essex St., Boston, Mass., mech. engr. BA 9/21. CD 9/6/61.

MIDDLE ATLANTIC

BUILDINGS—BA

▲ **N. Y., Kingston**—BA 10/24—Bd. Educ., 403 Broadway, (1) Mary's Ave. ELEMENTARY SCHOOL, $1,000,000; (2) Quarry St. JUNIOR HIGH SCHOOL, $2,600,000. Separate and/or combined. Perkins & Will, 55 Church St., White Plains, archts. CD 6/23/61, under LB and CD 10/20/60.

HEAVY CONSTRUCTION—LB & CA

▲ **NEW YORK**—State Dpt. P. Wks., State Office Bldg., Albany, ROADS,

N. Y.—**Jess F. Howes,** Sidney Center, N. Y., CA **$982,813,** est. $1,199,000, b. conc. 5.35 mi. Colchester-Delancey, SH 1272, Delancey-Delhi, SH 1441, Proj. F 845(4) Contr. FARC 61-133, Delaware Co., BA 8/24, CA 9/22;

N. Y.—**S. J. Groves & Sons Co.,** 201 S. Main St., Meriden, Conn., CA **$2,457,219,** est. $2,650,000, b. conc. 3.46 mi., misc. work 1.41 mi., comp. I-beam spans, two triple rein.-con. box bridges, double rein.-con. box bridge, 2.52 mi. Int. Rte. Conn. 571 (Jamesville-Dewitt) Syracuse-Fayetteville SH 5587, Proj. EACI 281-2(49), Contr. FISH 61, Onondaga Co., BA 8/24, CA 9/22;

N. Y.—**Parlow City Constr. Co.,** 3217 Pearl St., Endwell, N. Y., CA **$543,503,** est. $566,000, b. conc. Type 2A, 1.61 mi., misc. work 0.04 mi., repairs to stone arch bridge 1.56 mi. Trumansburg Village SH 5206, Proj. F 128(4), F 494(3), Contr. FARC 61-103, Tompkins Co. Grand total $3,983,535. BA 8/24, CA 9/20. CD 8/25/61, under LB.

▲ **PENNSYLVANIA**—State Hy. Dpt., 506 North Office Bldg., Harrisburg, ROAD,

Kimbob, Inc., P.O. Box 127, Harrisburg, Pa., CA **$2,964,245,** 14,834 ft. conc. of reinf. pavement 24 ft. on each side and 8 bridges, L.R. 799(4-A), Cumberland Co. BA 8/25/61. CD 8/29/61, under LB.

▲ **MARYLAND**—State Rds. Comn., 300 W. Preston St., Baltimore, Zone 3, ROAD,

Case Constr. Co., Mount Airy, Md. and **T. Edgie Russell,** Frederick, Md., CA **$3,281,111,** grade, drain, surf. Capitol Beltway from River Rd. to Sevens Locks Rd. incl. reloc. River Rd., reconstr. Burdett Rd., 15 span dual and 14 span single bridge, two single lane bridges and two culverts. M-512-53-55-56-57-58-320, Montgomery Co. BA 8/22, CA 9/15. CD 8/24/61, under LB.

BUILDINGS—LB & CA

▲ **Frouge Constr. Co., Inc.,** 680 5 Ave., New York 22, N. Y., LB **$5,067,000,** (9 bidders), fdns. and general constr. Jonathan Williams HOUSES, Proj. NYS-101, Marcy Ave., Division Ave., Roebling St. and Broadway, Brooklyn Boro, BROOKLYN, N. Y. New York City Housing Auth., Rm. 312, 299 Broadway, New York 7, N. Y., BA 9/26. CD 9/14/61;

H. Sand & Co., 250 W. 57 St., New York 19, N. Y., LB **$548,000,** (6 bidders), heating and ventilating Jonathan Williams HOUSES (Brooklyn, N. Y.);

John G. Hellman Co., Inc., 507 E. 76 St., New York 21, N. Y., LB **$473,000,** (4 bidders), electric work Jonathan Williams HOUSES, (Brooklyn, N. Y.);

Lipsky & Rosenthal, Inc., Madison Ave. and E. 112 St., New York 29, N. Y., LB **$709,900,** (7 bidders), plumbing work Jonathan Williams HOUSES, (Brooklyn, N. Y.).

▲ **Bernard Assocs., Inc.,** 2 Lawson Ave., East Rockaway, N. Y., CA **$3,000,000,** 5 story Hillcrest General HOSPITAL, Union Turnpike and Parsons Blvd., JAMAICA, N. Y. HGH Realty Corp., 89-34 Van Wyck Expressway, Jamaica 18, N. Y. Gustave W. Iser, 95 Madison Ave., New York 16, N. Y., archt.

▲ **Carlyle Constr. Corp.,** 131 E. 17 St., New York 13, N. Y., CA Est. over **$3,000,000,** 21 story, 100x155 ft. APARTMENT, 1185-1191 Second Ave. and 234-238 East 63 St., NEW YORK, N. Y. Irving Dimson, 131 East 17 St., New York 3, N. Y. Robt. Rosenwasser, 375 5 Ave., New York 16, N. Y., struct. engr. CD 4/19/61.

▲ **First National Realty & Constr. Corp.,** 630 Third Ave., New York 17, N. Y., Owner Builds, **$15,000,000,** 35 story Mayfair West APARTMENT, 15 W. 72 St. at Central Park West, NEW YORK, N. Y. CD 7/12/61.

▲ **Frouge Constr. Co., Inc.,** 680 Fifth Ave., New York 22, N. Y., Owner Builds, **$3,750,000,** 20 story APARTMENT, 114-122 E. 72 St., NEW YORK, N. Y. CD 9/14/61.

▲ **John McShain, Inc.,** 17th and Spring Garden Sts., Phila., Pa., CA **$4,067,200,** general contract Bid 4446, MEN'S HOUSE OF DETENTION BLDG., PHILA., PA. Dpt. Procurement, City Hall Annex, Phila., Pa. BA 8/9/61. CD 9761, under LB.

▲ **J. W. Bateson Co. Inc.,** 10130 Monroe Dr., Dallas, Tex., LB **$7,996,000** Proj. MD-2-18, 758 units George B. Murphy HOUSING PROJ. BALTIMOORE, MD. Baltimore Housing Auth., 905 Equitable Bldg., Baltimore 2, Md. BA 9/21. CD 9/18/61.

▲ **Blake Constr. Co. Inc.,** 1120 Connecticut Ave. N.W., Wash., D. C. CA **$3,750,000,** EMPLOYMENT SECURITY BLDG., Dpt. Labor, WASH., D. C. General Services Admin., 7th and D Sts. S.W., Wash., D. C. BA 8/22/61. CD 8/24/61 under LB.

SOUTH

HEAVY CONSTRUCTION—LB & CA

▲† **Electronic & Missile Facilities,** 2 LaFayette St., New York, N. Y., CA **$3,996,129,** 9 story CENTRAL LABORATORY and OFFICE FACILITY, Marshall Space Flight Center, HUNTSVILLE, ALA. National Aeronautics & Space Admin., Marshall Space Flight Center, Huntsville, Ala. BA 8/8/61. CD 8/15/61, under LB.

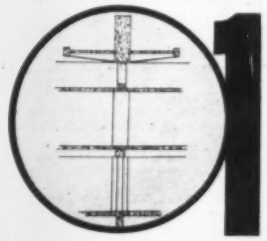
▲ **Panama Inc.,** Tennessee Bldg., Houston, Tex., CA Est. **$3,975,000,** 61 mi. 30 in. NATURAL GAS LINE, West Monroe, Ouachita Parish to Jena, LaSalle Parish, LOUISIANA. United Gas Pipe Line Co., United Gas Bldg., Houston, Tex. CD 6/12/61.

BUILDINGS—LB & CA

▲ **Thornington Constr. Co., Inc.,** 2106 North Hamilton St., Richmond, Va., LB **$3,093,000,** (8 bidders), W. T. Woodson HIGH SCHOOL, FAIRFAX, VA. Fairfax County Bd. Educ., Fairfax, Va. BA 9/21/61. CD 4/25/60.

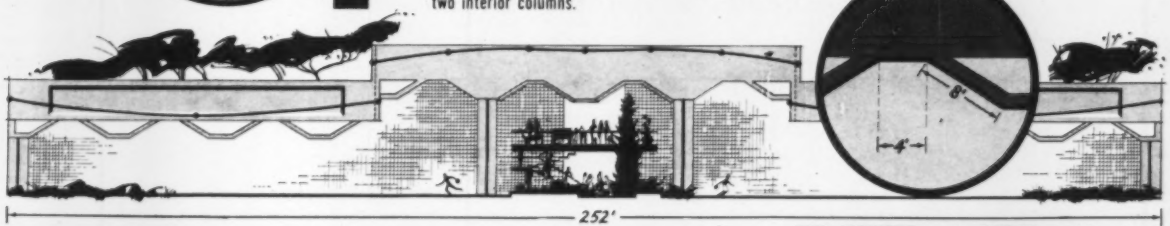
▲ **Virginia Engineering Co., Inc.,** 80-29th St., Newport News, Va., LB **$5,245,000,** (8 bidders), OFFICES, Department of Safety-Health-Welfare, Clay St., RICHMOND, VA. City of Richmond, City Hall, Richmond, Va. BA 9/26/61. CD 8/11/61.

▲ **Frank J. Rooney, Inc.,** 712 SE 17th St., Fort Lauderdale, Fla., CA **$6,500,000,** 16 story, 230 x 194 CB-S



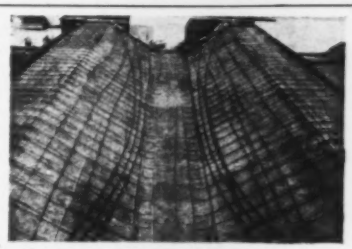
POST-TENSIONED PRESTRESSED CONCRETE BEAM HOLDS ROOF OF 42,500 SQ. FT. BOWLING ALLEY!

3½" thick folded plate lightweight prestressed concrete roof covers entire 252 ft. x 140 ft. building that has only two interior columns.



Three cast-in-place post-tensioned, prestressed concrete beams tied together with Prescon stressing tendons into one long unit make possible the unique structure of a 48 lane bowling alley that has no support columns in the lane area.

The Buccaneer Bowl in Corpus Christi, Texas was constructed at a cost of only $8.40 per square foot using a concrete roof and support beam prestressed by the Prescon System of post-tensioning. This price includes a partial basement, a mezzanine restaurant, observation deck and a luxurious lobby—all air conditioned. The cost of the folded plate and the supporting beams was $1.36 per square foot of area.



Forms built of 4' x 8' plywood sheets ready for pouring of folded plate roof. Stressing tendons provide strength for 70' span.

PRESCON®

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THE PRESCON CORPORATION

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DRake 7-3853	SUnset 1-4798	FAculty 1-3377	Albany, N. Y.
North Decatur, Ga.	Englewood, Colo.	Gardena, Calif.	HEmlock 9-1876

MEMBER PRESTRESSED CONCRETE INSTITUTE

330 units APARTMENT, 3233 NE 34th St., FORT LAUDERDALE, FLA. Coral Ridge Towers Corp., c/o contractor. CD 12/21/60.

MIDDLE WEST

HEAVY CONSTRUCTION—BA

▲ **O., Dayton**—BA 10/10—Bd. Comrs. Montgomery Co., Courthouse, Contract No. 1, SANITARY SEWERS for Harrison Township area, Plans deposit $50; Contract No. 2, SANITARY SEWERS for Randolph-Madison Township area, Improvement Area No. 1, Stillwater Sewer Dist., Plans deposit $50; Contract No. 3, SEWAGE PUMPING STATION NO. 1, Improvement Area No. 1, Stillwater Sewer District, Plans deposit $5. Loyd Huffman, 4221 Lamme Rd., Zone 39, co. san. engr. CD 9/21/60.

▲ **Mich., Detroit**—BA 10/17—Wayne Co. Rd. Comn., Dpt. P. Wks., 726 City-County Bldg., Zone 26, Contr. 2, 15,700 lin. ft. 8 ft. 6 in. SEWER, in tunnel, Rouge Valley Sewage Disposal System; Contr. 3, 16,600 lin. ft. 8 ft. 6 in. SEWERS, in tunnel, Rouge Valley Sewage Disposal System; Contr. 4, 4,400 lin. ft. 6 ft. 6 in. to 5 ft. 0 in. in tunnel, 16,600 lin. ft. 8 ft. 6 in. to 3 ft. 0 in. open cut, Rouge Valley Sewage Disposal System; Contr. 5, 500 lin. ft. 30 in. SEWER, in open cut and one River Siphon, Rouge Valley Sewage Disposal System; Contr. 6, 700 lin. ft. 6 ft. 6 in. SEWERS, 5 ft. 6 in., in tunnel, 21,700 lin. ft. 6 ft. 6 in. to 5 ft. 0 in. in open cut, Rouge Valley Sewage Disposal System; Contr. 7, 1,600 lin. ft. 42 in. SEWER, in tunnel, 6,100 lin. ft. 30 in. open cut, Rouge Valley, Sewerage Disposal System. Plans deposit $5. each. S. Lifsitz. co. engr. CD 9/6/61.

▲ **O., Athens**—BA 10/31—Dpt. P. Wks., State Dept. Bldg., Columbus, Zone 15, DORMITORY NO. 2 and NO. 3, Ohio University, Plans deposit $50 each. CD 2/27/61.

HEAVY CONSTRUCTION—LB & CA

▲ **OHIO**—State Hy. Dpt., State Depts. Bldg., Columbus, Zone 15,

O.—**C. F. Gerken & Sons, Inc.**, Napoleon, O., LB **$454,249**, est. $570,600 (3 bidders), widening 7.6 mi. State Rte. 4, resurf. from Crawford-Marion Co. Line to Beal Rd. at south edge of Bucyrus, Proj. 659, Crawford, Co.;

O.—**Joseph Bucheit & Sons Co.**, 4040 Simon St., Youngstown, O., LB **$4,290,195**, est. $5,059,000 (11 bidders), six lane westward extension Akron Expressway from Sweitzer Ave. to Bowery St., Incl. 7 bridges, Proj. 663, Summit Co. CD 9/5/61.

▲ **M. F. Velotta & Sons**, 33141 Bainbridge St., Solon, O., and **Condon-Cunningham**, 729 James Rd., Columbus, O., CA **$3,553,729**, PAVING Rockside Rd. from Brecksville to Turney Rds., CLEVELAND, O. Bd. Comrs. Cuyshoga Co., County Admin. Bldg., 1219 Ontario St., Cleveland 13, O. BA 9/7/61. CA 9/14/61. CD 9/14/61, under LB.

▲ **Paschen Contractors, Inc.**, 2739 N. Elston St., Chicago, Ill., LB **$6,637,000** (6 bidders), PUMP CHEMICAL and ADMINISTRATION BLDG., Central Dist. Water Filtration Plant, CHICAGO, ILL. City, City Hall, Chicago, Ill. BA 9/20/61. CD 8/24/61.

▲ **Santucci Constr. Co.**, 5115 Church St., Skokie, Ill., CA **$2,797,800**, 144 in. diam. SEWER, S. Pennsylvania Ave. from Drexel to Rawson Aves., Oak Creek, MILWAUKEE, WIS. Metropolitan Sewerage Comn. of the County of Milwaukee, P.O. Box 2079, Milwaukee, Wis. BA 9/19/61. CA 9/22/61. CD 9/22/61, under LB.

▲ **Santucci Constr. Co.**, 5115 Church St., Skokie, Ill., LB **$3,562,300** (4 bidders), 144 in diam. SEWERS, Pennsylvania Ave., E. Rawson to E. College Aves., Oak Creek, MILWAUKEE, WIS. Metropolitan Sewerage Comn. of the County of Milwaukee, P.O. Box 2079, Milwaukee, Wis. BA 9/26/61. CD 8/31/61.

▲ **Northeast Constr. Co.**, 16099 Common Rd., Roseville, Mich., LB **$1,034,631**, Proj. NS-4, 6,232 lin. ft. 12 ft. 0 in. to 36 in. rein-con. DRAIN, open cut, jct. chambers, manholes, structures, Birmingham, Troy, Clawson and Royal Oak, PONTIAC, MICH. Twelve Town Drains, 4th Floor, Bd. Supervs. Office, Oakland County Bldg., 1 Lafayette St., Pontiac, Mich. BA 9/22. CD 8/11/61;

Mancini Constr. Co., 23170 Schoenherr Rd., East Detroit, Mich., Lb **$1,785,955**, Proj. MS-2, 10,020 lin ft. 11 ft. 0 in. to 7 ft. 6 in. rein.-con. DRAIN, tunnel, jct. boxes, manholes, structures, Berkley, Madison Heights, Royal Oak, Huntington Woods, (Pontiac, Mich.);

Sinacola Constr. Co., Inc., P.O. Box 8, N.E., Livonia, Mich., LB **$696,043**, Proj. MS-5, 7,794 lin. ft. 9 ft. 0 in. to 6 ft. 0 in. rein.-con. DRAIN, open cut jct. boxes, manholes, structures, Berkley, Madison Heights, Royal Oak, Huntington Woods, (Pontiac, Mich.);

C. J. Rogers, J. A. Healy, Gargaro Co. and Barton-Malow, 6567 E. 7-Mile Rd., Detroit, Mich., LB **$2,049,834**, Proj. SS-2, 5,667 lin. ft. 14 ft. 3 in. x 13 ft. 3 in. rein-con. double box DRAIN; 2,268 lin. ft. 6 ft. 0 in. rein.-con. pipe, open cut, conc. bedding, manholes, jct. boxes, inlets, cross-overs, Hazel Park, Oak Park, Ferndale, Southfield (Pontiac, Mich.);

Ferrera Constr. Co., P.O. Box 4826, Redford Sta., Detroit 19, Mich., LB **$3,160,878**, Proj. SS-6, 17,402 lin. ft. 12 ft. 0 in. to 4 ft. 0 in. rein-con. DRAIN, tunnel, rein.-con. pipe, manholes, structures, conn. Hazel Park, Oak Park, Ferndale, Southfield, (Pontiac, Mich.).

BUILDINGS—LB & CA

▲ **Miletti Constr. Co.**, 2473 State Rd., Cuyahoga Falls, O. CA **$2,533,907**, est. $3,000,000, (5 bidders), 2 story, 220,023 sq. ft. HARVEY FIRESTONE SENIOR HIGH SCHOOL Rampart Dr., northwest section, AKRON, O. Bd. Educ., 70 N. Broadway, Akron, O. BA 9/13/61, CA 9/18/61. CD 8/21/61.

Spohn Heating & Ventilating Co., 955 Home St., Akron, O., CA **$631,028**, (4 bidders), plumbing, heating, ventilating, HARVEY FIRESTONE SENIOR HIGH SCHOOL, (Akron, O.).

▲ **Koppers Co., Inc.**, Koppers Bldg., Pittsburgh 19, Pa., CA Est. **$20,000,000**, BLAST FURNACE, Cleveland Works, Jennings St., CLEVELAND, O. Jones & Laughlin Steel Corp., 462 Gateway Center, Pittsburgh 30, Pa.

▲ **John W. Galbreath & Co.**, 42 E. Gay St., Columbus, O., CA **$5,621,000**, est. $5,000,000, 450 family units RETIREMENT CENTER COMMUNITY, 28 acres on Riverside Dr. and Waltham Rd., COLUMBUS, O. First Community Village, Inc., 1320 Cambridge Blvd., Columbus, O. CD 6/27/60.

▲ **Country Club Homes, Inc.**, c/o Frank Fabec, 19671 Lake Shore Blvd., Cleveland 19, O., Owner Builds, **$5,000,000**, $500,000 first year (5 year program) 300 HOMES, next to Madison Lakelands Golf Course, NORTH MADISON, (BR. MADISON), O.

▲ **Whitehead & Kales Co.**, 58 Hatinner St., Detroit, Mich., CA, erection, fabrication 4,000 tons steel for 580,000 kw STEAM ELECTRIC GENERATOR, Unit 4, Tanners Creek PLANT, LAWRENCEBURG, IND. Indiana & Michigan Electric Co., 2101 Spy Run Ave., Fort Wayne, Ind. CD 3/17/61.

▲ **J. L. Simmons Co.**, 506 S. Wabash Ave., Chicago, Ill., CA **$2,587,400**, general contract 5 story, 200 bed HOSPITAL, STREATOR, ILL. St. Mary's Hospital, Streator, Ill., BA 7/26/61. CD 7/26/61., **Hitchcock Air Condition, Heating & Piping Co.**, 813 SW Washington St., Peoria, Ill., CA **$1,232,500**, mechanical, air-conditioning contract for 5 story, 200 bed HOSPITAL, (Streator, Ill.).

MISSISSIPPI TO ROCKIES

HEAVY CONSTRUCTION—BA

▲ **Mo., St. Louis**—BA 10/26—St. Louis Housing Auth., 2031 Olive St., Zone 3, Proj. MO-1-6A(1), one low-rent housing 112 unit APARTMENT C-A, gas meter house. Plans deposit $100. Hellmuth, Obata & Kassabaum, Inc., 315 N. 10 St., Zone 1, archts. CD 12/28/60.

▲ **Tex., Lubbock**—BA 10/31—Texas Technological College, Lubbock, 4 and 6 story, concrete frame, brick women's DORMITORIES. $3,750,000. Plans deposit $100. CD 6/7/61.

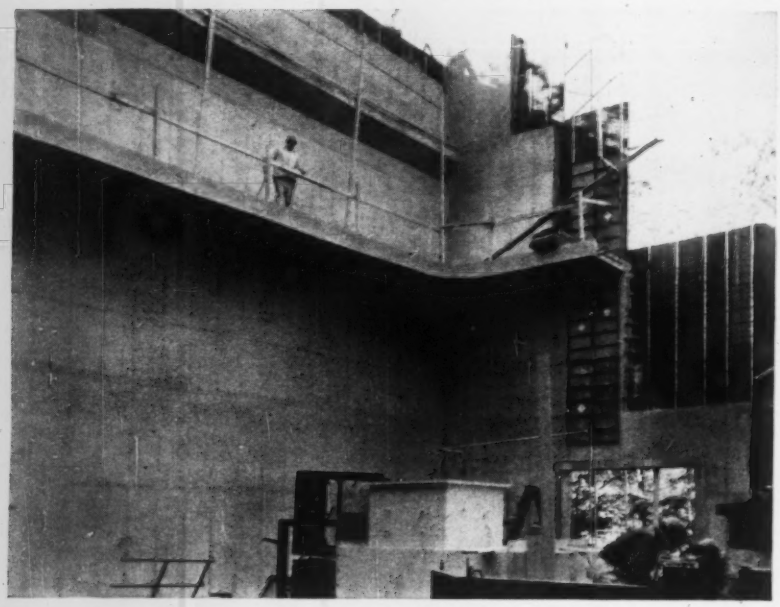
HEAVY CONSTRUCTION—LB & CA

▲ **MINNESOTA**—State Hy. Dpt., Hy. Bldg., St. Paul, bids opened 9/15, ROADS,

Minn.—**Brown & Leguil**, Rte. 1, Mankato, Minn. and

(Continued on page 66)

Prefabs form cut-up job . . .



Catwalks, haunches poured together with Symons steel-ply forms

One of the best case studies of prefab form versatility in action was that of the atomic reactor facility for Cornell University at Ithaca, N.Y. On one phase of the project, the contractor, Rouse Construction Company, Gouverneur, N.Y. used Symons Steel-Ply Forms to pour monolithically the walk around the reactor, the catwalk and the haunch above it. Pours averaged about 16 feet high.

Symons Forms also showed their adaptability when forming was done around the complicated reactor machinery. It was imperative here that no ties be used in pouring the first six feet of the wall. To solve the problem, Symons Forms were simply attached together and the machinery itself acted as bracing. Some of the walls were as high as 45 feet when completed.

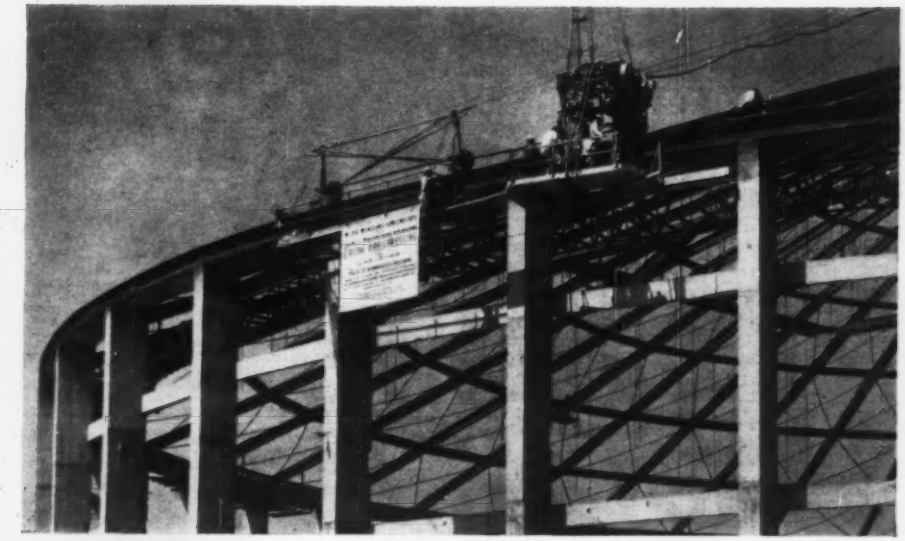
For complete information on Symons Steel-Ply Forms, write us. Ask also about our free engineering service . . . rental purchase options . . . and complete-line catalog.

Symons CLAMP & MFG. CO.

4265 Diversey Avenue Dept. K-1 Chicago 39, Illinois

Warehouses throughout the U.S.A.

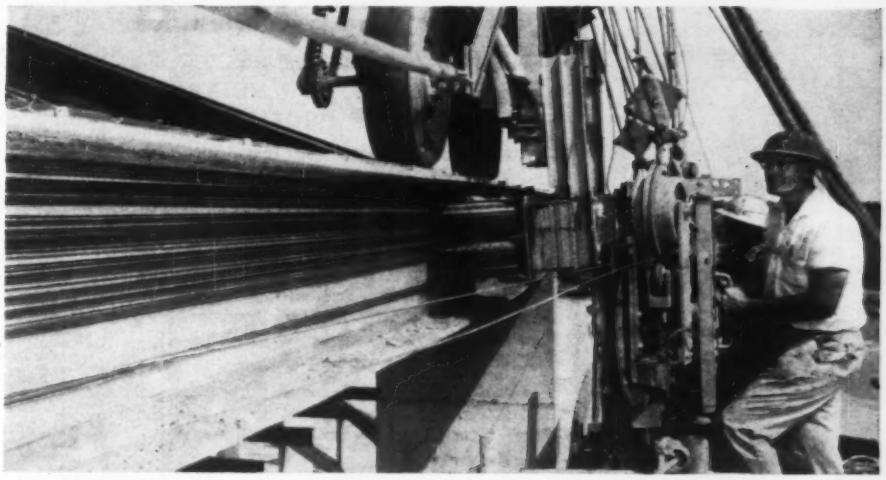
MORE **SAVINGS** FROM **SYMONS**



Your assurance of American-made quality

This is Mississippi's partially completed coliseum in Jackson. Visible atop the columns is the tension ring beam that supports the roof. Prestressed with CF&I Wire, the beam will withstand more than 3 million pounds tension.

160 miles of wire prestresses new coliseum



Wire-winding machine, operated by its designer, Mr. Jack Crom, pulls CF&I Prestressed Concrete Wire tight around the ring beam. After the wire has been laid and tensioned, pneumatic mortar is applied. In all, 15 layers of prestressing wire were used.

The State of Mississippi's new coliseum — now under construction on the Fair Grounds in Jackson — will feature an unusual form of construction that is both economical and efficient. The 2800-ton conical roof is supported by a giant tension ring beam prestressed with 160 miles of CF&I Prestressed Concrete Wire.

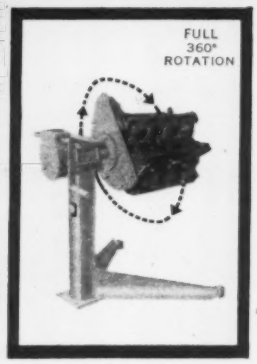
This prestressed method was the first choice because preliminary engineering studies proved a saving of approximately 10% could be realized in comparison with other methods.

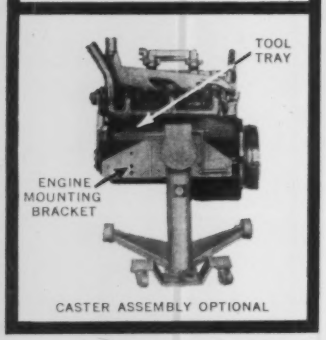
Why was CF&I Prestressed Concrete Wire chosen? "Because we had dealt with CF&I in the past," Mr. Crom, President, Crom Prestressing, Inc., an affiliate of the Crom Corporation, Gainesville, Fla. says, "and they have always provided us with valuable technical information and helped us with our metallurgical problems. Also, we've always been able to count on prompt delivery of shipments."

In addition to Prestressed Concrete Strand and Wire, CF&I produces a wide range of steel products for American industry, including: Welded Wire Fabric; Rebars; Nails and Staples; Realock Chain Link Fence; Grader Blades and Cutting Edges; CF&I-Wickwire Rope; and many other quality steel products. For complete information, contact your nearby CF&I sales office. 6309

THE COLORADO FUEL AND IRON CORPORATION
Denver • Oakland • New York
Sales Offices in Key Cities

Top, bottom, sides... all hard to reach engine areas worked easily with new OTC positioning stand





ENGINE WORK DONE FASTER, SAFER, EASIER, FOR BETTER OVERALL SHOP PROFITS

New OTC engine positioning stand is fast and safe to operate— allows mechanic to easily rotate engines through a full 360°.

A self-locking matched worm-and-gear set, with 8" crank, allows engine to be locked in any position. Engines are mounted on stand by means of an adapter bracket which is bolted to stand and engine.

Model No. 1700 weighs only 135 lbs., handles engines weighing up to 1200 lbs. Stand can be bolted to floor, or made mobile with optional caster assembly.

Here is a valuable piece of equipment which speeds up engine service . . . gives you added profit in time saved.

Contact your OTC distributor for more information on this and other time-saving OTC tools.

RESEARCH · ENGINEERING · DEVELOPMENT · OTC

OWATONNA TOOL COMPANY

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Designers and manufacturers of the world's most complete line of Maintenance Tools and Hydraulic Equipment.

PULLERS AND PULLER SETS · HYDRAULIC RAMS AND PUMPS · HYDRAULIC SHOP PRESSES · HAND TOOLS

(Continued from page 64)

Hoover Constr. Co., Hoover Rd., Virginia, Minn., LB **$3,841,231** grading 6.7 mi. and Bridges Nos. 9738, 9739, 9747 (southbound) and Bridge No. 9748 (eastbound), Hennepin Co.;

Minn.—**Mark Sand & Gravel Co.**, Box 396, Fergus Falls, Minn., and **E. Zimmerman**, Barrett, Minn., LB **$446,019**, grading, gravel base and road mixed bit. base 15.4 mi. Pope Co.;

Minn.—**C. L. Nelson Co., Inc.**, Box 464, Brainerd, Minn., LB **$219,249**, plant mixed bit. surf. 26.1 mi., Roseau Co. (Correction-low bidders). CD 9/20/61, under LB.

▲† **Western Contracting Corp.**, 400 Benson Bldg., Sioux City, Iowa, LB **$5,545,553**, est. $5,689,446, (3 bidders) Stage No. 2, EARTHWORK; approx. 9.7 million cu. yd. excav., 7 million cu. yd. fill, 150,000 tons spalls and riprap, Big Bend Reservoir, ENG-25-066-62-15, SOUTH DAKOTA. U. S. Eng., 6012 U. S. Post Office and Court House, Omaha, 2, Neb. BA 10/5/61. 9/21/61.

BUILDINGS—LB & CA

▲† **Electronic & Missile Facilities, Inc.**, 2 Lafayette Sq., New York, N. Y., LB **$7,219,000** Base Bid (4 bidders), extension, remodeling POST OFFICE and CUSTOM HOUSE, 180 E. Kellogg Blvd., ST. PAUL, MINN. General Services Admin., Region 6, 2306 E. Bannister Rd., Kansas City 10, Mo. BA 9/20. CD 9/11/61.

▲ **The Early Co.**, 755 Bester St., Shreveport, La., CA **$3,900,000**, 150,000 M.c.f.c. GAS-PROCESSING PLANT, near BEAUMONT, TEX. Port Gas Processing Co., (sub. Hudson Gas & Oil Corp.), 2711 Danville St., Houston, Tex.

▲ **Inwood Constr. Co.**, Trinity Universal Bldg., Dallas, Tex., CA Est. **$3,885,000**, 15 story, 119-unit masonry APARTMENT, DALLAS, TEX. Corrigan Properties, 211 North Ervay St., Dallas, Tex. BA 8/29/61. CD 8/25/61.

FAR WEST

BUILDINGS—BA

▲ **Calif., Los Angeles**—BA 10/31—Webb & Knapp, Inc. and Aluminum Co. of America, 400 S. Beverly Dr., Beverly Hills, Calif., (selected list bidders), 13 story steel frame Gateway Bldg. OFFICE, Century City. $3,000,000. Welton Becket & Assoc., 10000 Santa Monica Blvd., archts. CD 7/7/61.

HEAVY CONSTRUCTION—LB & CA

▲ **CALIFORNIA**—State Div. Hys., 120 S. Spring St., Los Angeles, Bids opened 9/21, RQAD,

Guy F. Atkinson Co., 10 West Orange Ave., South San Francisco, Calif., LB **$4,729,866**, (8 bidders), 1½ mi. eight lane freeway, San Diego Freeway between Latijera Blvd. and 0.4 mi. north of Jefferson Blvd., Culver City, Los Angeles Co. CD 8/16/61.

▲ **South Sutter Water Dist.**, P.O. Box 62, East Nicholaus, Calif., rejected bids Aug. 28, Camp Far West Proj. DAM, CANAL and appurtenances, Bear River, Yuba, Sutter and Placer Counties, California. McCreary-Koretsky Engineers, 1140 Howard St., San Francisco, Calif., engrs. **$4,500,000**. Will re-advertise. CD 8/16/61.

▲ **Williams & Burrows, Inc.**, 500 Harbor Blvd., Belmont, Calif., CA **$3,056,140**, Virginia Ranch DAM, SPILLWAY, OUTLET, 400,000 cu. yd. excav., 7,000 cu. yd. struc. concrete, Browns Valley, Yuba Co., CALIFORNIA. Browns Valley Irrigation Dist., Browns Valley, Calif. CA 9/7. CD 8/31/61, under LB.

▲ **Healy Tibbitts Constr. Co., C, K, F-M (Contracting & Material Co., Evanston, Ill., Kenny Constr. Co., Skokie, Ill. and Foster-Marsch Corp., Pittsburgh, Pa.) and Graver Mfg. Tank Co.**, 411 Brannan St., San Francisco, Calif., CA **$3,851,623**, (5 bidders), Proj. 850, three river crossings Third Mokelumne AQUEDUCT, San Joaquin and Contra Costa Counties, OAKLAND, CALIF. East Bay Municipal Utility Dist., 2130 Adeline St., Oakland, Calif. CD 6/9/58.

▲ **Fisher Contg. Co.**, P.O. Box 6306, Phoenix, Ariz., LB **$3,364,738**, INTERCEPTOR SEWER, Contr. 4, SAN DIEGO, CALIF. City, Rm. 161, Civic Center Bldg., San Diego 1, Calif. BA 9/27. CD 9/6/61.

BUILDINGS—LB & CA

▲ **Louis C. Dunn, Inc.**, 3101 Wilshire, Los Angeles, Calif., CA Est. **$4,500,000**, 18 story CAMEO TOWER APARTMENT and parking, Wilshire Business District, LOS ANGELES, CALIF. Jeff V. Cameo, c/o Orr, Strange, Inslee & Senefeld, archts., 3142 Wilshire, Los Angeles, Calif.

▲ **S. Patti Constr. Co.**, 1340 Admiral Blvd., Kansas City, Mo., LB **$4,398,000**, (7 bidders), SOCIAL SCIENCE BLDG. UNIT 1, University of California, LOS ANGELES, CALIF. University of California at Los Angeles, 405 Hilgard Ave., Los Angeles, Calif. BA 9/27. CD 9/21/61.

▲ **Taylor Constr. Co.**, 9350 Wilshire, Beverly Hills, Calif., CA Est. **$5,000,000**, 13 story APARTMENT HOUSE with underground parking, Wilshire Blvd. Westwood Village Area, LOS ANGELES, CALIF. Wilshire-Holmby Co., c/o Pollock & Drazan, Inc., archt., Pacific Palisades, Calif.

▲ **Kirk Constr. Co.**, 8066 Morningside Way, La Mesa, Calif., CA **$20,000,000**, RESIDENTIAL and COMMERCIAL DEVELOPMENT, Cimarron Ranch, Hy. 41, LEMOORE, CALIF. Owner, c/o general contractor.

▲ **William Simpson Constr. Co.**, 2401 Beverly Blvd., Los Angeles, Calif., CA **$25,000,000**, OCCIDENTAL CENTER to incl. one 11 story bldg., one 25 story tower,

(Continued on page 68)

ALPHA news and notes from the field

BETTER CONSTRUCTION THROUGH BETTER USE OF CEMENTS

Types of Portland Cement and Their Uses

The 24 cities and towns in the United States named Portland had nothing to do with naming "portland" cement. It got its name from Joseph Aspdin, an English bricklayer who invented portland cement in 1824 and named it after the stone quarried on the Isle of Portland, off the coast of Great Britain.

Cement vs. Concrete

There are still people who speak of "cement sidewalks", "cement highways" and "cement block". In correcting these people it should be explained that cement immediately loses its identity when mixed with water and aggregates. It becomes concrete, mortar, stucco, plaster and similar useful building materials. Portland cement is hydraulic cement. This means that concrete made with portland cement will set or harden under water. This one feature has made portland cement a revolutionary material as compared with the original "natural" cements.

5 Principal Types of Cement

There are five types of portland cement, each with fairly definite characteristics and job applications. The accompanying table shows approximate relative strengths of concrete made with the various types of cement.

Type I Regular Portland Cement

Made for general concrete construction such as paving, sidewalks, buildings, bridges, tanks, and similar structures where no unusual conditions are likely to be encountered.

Relative Strengths of Concrete Made with Various Types of Portland Cement

TYPE OF CEMENT	COMPRESSIVE STRENGTH—Percentage of Strength of Type I Concrete		
	3 Days	28 Days	3 Months
I	100%	100%	100%
II	80%	85%	100%
III	190%	130%	115%
IV	50%	65%	90%
V	65%	65%	85%

Source: Concrete Construction—Guide to Better Field Practice

Type II Moderate Sulphate-Resistant Portland Cement

Similar to Type I but provides better resistance to sulphate attack. When hardening, it generates heat at a slower rate and for this reason is often used in massive structures such as piers, dams, abutments and heavy retaining walls.

Type III High-Early Strength Portland Cement

This cement is used where high strengths are desired at very early periods. It provides advantages of early form removal, for emergency jobs to provide uninterrupted use during repairs or remodeling and to help avoid freezing damage. It is ground finer than Type I cement.

Type IV Low-Heat Portland Cement

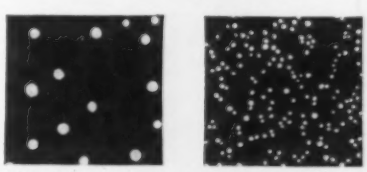
A special cement for use where the rate and amount of heat generated during hardening must be kept at a minimum. It also develops strength at a lower rate.

Type V Sulphate-Resistant Portland Cement

A special cement intended for use only in structures exposed to severe sulphate action, such as in some western states having soils or waters of high alkali reactivity.

Air-Entraining Portland Cements

These cements produce concrete resistant to severe frost action and the effects of salt applications for snow and ice removal. They contain small quantities of air-entraining agents which are interground with the cement clinker during manufacture. The various types of cement containing such additions are designated Types IA, IIA, IIIA, etc.



Greatly magnified non-air-entrained concrete (left) and air-entrained concrete (right) showing air bubbles (white) and fine sand particles (dark).

Free reprints of this page are available. Make requests to your Alpha Representative or write to Alpha Portland Cement Co., Easton, Pa.

ALPHA
PORTLAND CEMENT COMPANY
Alpha Building, Easton, Pa.

(Continued from page 66)

one 5 story parking structure, LOS ANGELES, CALIF. Occidental Life Insurance Co., Box 2101, Terminal Annex, Los Angeles, Calif. William L. Pereira & Assoc., 5657 Wilshire Blvd., Los Angeles, Calif., archts. Brandow & Johnson, 2430 W. 3 St., Los Angeles, Calif., engrs. CD 2/8/61.

CANADA

HEAVY CONSTRUCTION—LB & CA

▲ **QUEBEC**—Provincial Dpt. Rds., Parliament Bldgs., Quebec City, Bids opened 9/20, ROADS,

Que.—**South Shore Constr. Inc.**, 2260 Carriers St., Montreal, Que., LB **$2,554,208**, (6 bidders), Section Q.K., 4.26 mi. Trans-Canada Hy., Dorval and St. Laurent (Q.K. 4) Dorval. CD 8/28/61;

Que.—**McNamara Quebec Ltd.**, 3901 Jean Talton St. W., Montreal, Que., LB **$1,136,498**, (4 bidders), 4.68 mi. Trans-Canada Hy., St. Simon de Ramsey and St. Liboire (Q.F. 17) St. Liboire;

Que.—**Felicien St. Pierre**, Notre Dame du bon Conseil, Que., LB **$1,520,920**, (13 bidders), 10.96 mi. Trans-Canada Hy., St. Eulalie and St. Leonard (Q.E. 19) Ste. Eulalie. CD 9/7/61.

BUILDINGS—LB & CA

▲ **Smith Bros. & Wilson Ltd.**, 1267 Richards St., Vancouver, B. C., CA **$3,000,000**, 100 x 600 ft. PAPER MACHINE ROOM, GROUNDWORK, MILL in connection with plant's newsprint capacity, PORT ALBERNI, B. C. MacMillan Bloedel & Power River Ltd., 1199 W. Pender St., Vancouver, B. C. CA 9/22/61. CD 4/20/51.

AMERICANS ABROAD

BUILDINGS—LB & CA

▲ **Thai Oil Refinery**, Bangkok, Thailand, and group headed by **Shell Oil Co.**, 50 W. 50 St., New York 19, N. Y., U.S.A., Own Forces, **$35,000,000**, 40,000 barrel/day OIL REFINERY on Gulf of Siam near here, SRIRICHA, THAILAND

▲ **Foster Wheeler Ltd. (subsidiary Foster Wheeler Cor.)**, New York, N. Y., U.S.A., with **Frazer & Chalmers Pty Ltd. and O. Grinaker Pty Ltd.**, CA 70,000 bbl. REFINERY, incl. crude distillation unit; hydro-desulfurization unit; platforming incl. stabilizer unit; sulfur recovery unit; sour water stripper and LPG stripper; amine treating facilities; and off-site facilities at Reunion Rocks, near DURBAN, REPUBLIC OF SOUTH AFRICA. South African Petroleum Refineries Pty, Ltd., Durban, Republic of South Africa.

LATIN AMERICA

HEAVY CONSTRUCTION—BA

▲ **Ecuador, Guayas**—BA 11/8—Direccion Estudios de la Direccion General de Obras Publicas, Quito, OIL PIPE LINE and 1 m. g. d. WATER MAIN.

CUT WATER SUPPLY COSTS with REDA Submergible PUMPS

. . . and still obtain maximum water supply and maximum pressure for ALL your water needs. Here's Why:

1. QUALITY CRAFTSMANSHIP . . . Yet production line cost . . . A complete line of 2-pole and 4-pole models to meet operating heads and capacities required. Both electric, submergible motor and pump are REDA manufactured.

2. Oil lubricated motors require less power per H.P. PROVIDE MORE WATER PER DOLLAR than comparable units.

3. Low Installation and Operating Cost. No special piping needed, no drive shafts, rods, belts or gears or costly foundations are required. Operation is completely automatic with minimum controls required.

PUMP TYPE	UNIT O. D.	DESIGN CAPACITY GPM	DESIGN LIFT HEAD IN FEET	
			MAXIMUM	MINIMUM
D-47E	6"	55	2000	200
G-70E	6"	72	5400	180
G-120A	6"	110	3500	105
G-160	6"	150	2750	82
I-200	8"	210	2000	54
FR-300	8"	325	1250	54
J-400	8"	480	780	60

PUMP TYPE	UNIT O. D.	DESIGN CAPACITY GPM	DESIGN LIFT HEAD IN FEET	
			MAXIMUM	MINIMUM
GB-600	10"	600	600	60
KG-725	10"	800	490	69
N-500	10"	425	1100	30
N-750	11"	(c)600*	1000	30
		(a)700		
P-1000	12"	1200	1000	46
R-1500	14"	1800	700	65
T-2000	16"	2250	600	85

*(c) and (a) designate impeller cut within the same pump type.

Models Available from ⅓ to over 300 H.P. Call or Write for Industrial Bulletin R-432 and more complete information.

REDA PUMP COMPANY / BARTLESVILLE, OKLAHOMA

Manufacturer of Submergible, Electric Motors and Pumps for over 40 years. Pumps for Oil, Brine, Water, Gasoline, Jet Fuel, Chemicals, LPG

SIGN OF QUALITY SUBMERGIBLE REDA PUMPS

PHONE FE 6-7900

FOREIGN

HEAVY CONSTRUCTION—BA

▲ **Australia**—BA 11/8—Queensland Govt. Railways, Comr. Railways, Railways Bldg., Adelaide St., Brisbane, Contr. 8, Mt. Isa RAILWAY PROJ., consisting 55 mi. roadway exclusive of track laying in 36 locations, Queensland. Ford, Bacon & Davis, Inc., Box 443 F, GPO, Brisbane, Australia, engr. CD 9/22/61.

BUILDINGS—LB & CA

▲ **E. A. Watts Proprietary Ltd.**, Melbourne, Australia, CA Est. **$10,200,000**, 24 story BANK and HEADQUARTERS BLDG., SYDNEY, AUSTRALIA. Reserve Bank of Australia, Box 3947, G.P.A., Sydney, New South Wales, Australia. CD 5/16/61.

For additional reports see CONSTRUCTION DAILY REPORTS SECTION

PROPOSED PROJECTS

SEWERS, WASTE DISPOSAL

▲ **Ill., Rockford**—City, City Hall, **$4,000,000** bond election Nov. 7, STORM DRAINAGE. CD 4/20/60.

▲ **N. J., Jersey City**—City Sewer Auth., City Hall, RENOVATION SEWERAGE SYSTEM. **$3,000,000**. Mayo, Lynch Assocs., 90 Hudson St., Jersey City, consult. engrs.

▲ **Utah, Salt Lake City**—Salt Lake City Municipal Corp., City-County Bldg., Zone 11, voted **$7,000,000** bonds Sept. 12, SEWAGE TREATMENT PLANT, Kennedy Engineering, 604 Mission, San Francisco, Calif., consult. engrs.; voted **$2,500,000** bonds Sept. 12, MAIN TRUNK OUTFALL SANITARY SEWER, Redwood Rd.; voted **$2,500,000** bonds Sept. 12, STORM DRAINS and SEWERS. Roy McLeese, city engr. CD 8/10/61.

STREETS AND ROADS

▲ **O., Youngstown**—City, City Hall, **$9,000,000** bond election Nov. 7, STREET IMPRVS. CD 4/13/59.

EARTHWORK, WATERWAYS

▲ **Connecticut**—Hartford Flood Comns., c/o J. N. Gill, State Office Bldg., Hartford, 30,080 acres WATERSHED PROTECTION, South Branch Park River, for Soil Conservation Service, **$3,759,244**.

▲† **Oklahoma**—Sallisaw Creek Watershed Assocs., c/o Glen Smith, Rte. 2, Sallisaw, WATERSHED PROTECTION 185,280 acres, Sallisaw Creek, for Soil Conservation Service. **$3,561,751**.

UNCLASSIFIED

▲ **California**—State Div. Architecture, 1120 N St., Sacramento, CONSERVATION CENTER BRANCH 10 mi. west of Sonora, Tuolumne Co. for State Department of Corrections, **$5,000,000**; North Coast CONSERVATION CENTER BRANCH at Redway, 3 mi. north of Garberville, Humboldt Co., **$5,000,000**. Bids late Spring 1962.

▲† **South Dakota**—Bureau Reclamation, Dpt. Interior, Bldg. 1A, Denver Federal Center, Denver, Colo., 73 mi. 115 kv. TRANSMISSION LINES from Oahe Dam to Eagle Butte; 95 mi. from Rapid City to Maurine, through Newell substation addns. at Philli and Wall to supply missile bases, **$4,700,000** (3,000,000 appropriated).

▲ **Texas**—Oklahoma—Continental Pipeline Co., Bartlesville, Okla., 225 mi. PRODUCTS LINE, Wichita Falls, Tex. to Ponca City, Okla. $3,375,000.

PUBLIC BUILDINGS

▲ **Calif., Los Angeles**—Bd. Educ., 1425 S. San Pedro St., Los Angeles,
plans by Balch-Hutchason-Perkins, 2933 Rowena Ave., Birmingham HIGH SCHOOL, Van Nuys, **$4,300,000**; plans by Welton Becket & Assoc., 1000 Santa Monica Blvd., Los Angeles, Calif., Holmes JUNIOR HIGH SCHOOL, **$2,800,000**. CD 12/1/60.

▲ **Colo., Englewood**—Cherry Creek School Dist. No. 5, Englewood, **$5,000,000** bond election Dec. 7, 6 ELEMENTARY SCHOOLS, 1 JUNIOR HIGH SCHOOL, 3 ELEMENTARY SCHOOLS ADDNS.

▲ **Ill., Chicago**—Dpt. Purchase, City Hall, Zone 2, 3 level, 3,000 car UNDERGROUND GARAGE, Jackson Blvd. and Michigan Blvd., **$5,000,000**. CD 9/2/52.

▲ **Mich., Temperance**—Bd. Educ. Bedford Twp. School Dist., Temperance, plans by McLaughlin & Keil, Dominion Bldg., Lima, O., HIGH SCHOOL, Jackman-Dean GRADE SCHOOL ADDN. and BUS GARAGE ADDN. **$3,500,000**.

▲† **Mo., Fort Leonard Wood**—U. S. Eng., 1800 Federal Bldg., Kansas City 6, Mo., BUILDINGS and UTILITIES. **$10,080,000** (appropriated) (CORRECTION-status and noted date). CD 9/14/61.

▲ **N. Y., Syracuse**—City, City Hall, plans by Carl W. and R. T. Clark, 625 James St., Northeast SENIOR HIGH SCHOOL. **$4,500,000**. Bids Nov. 15, 1961. CD 8/9/59.

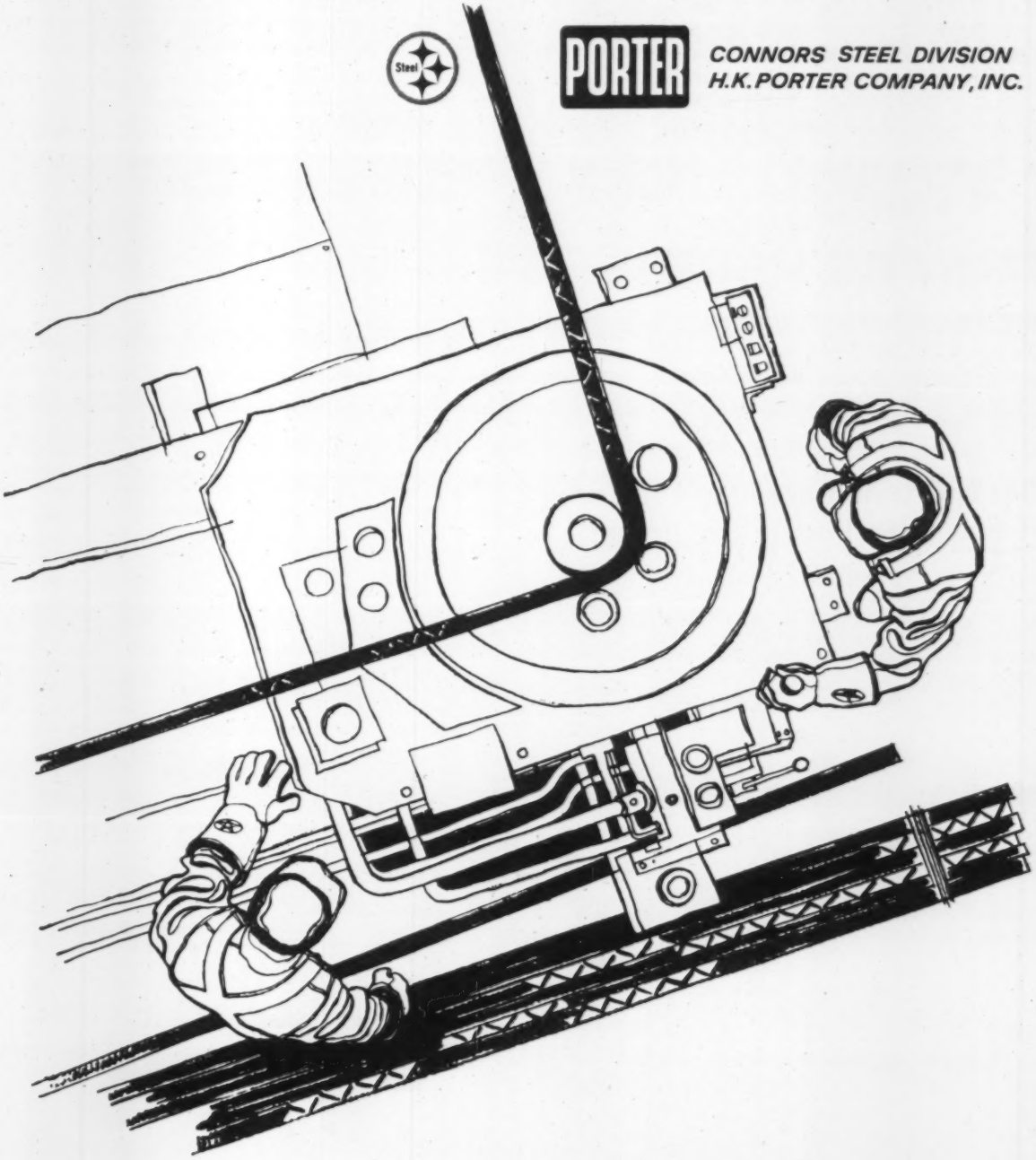
(Continued on page 72)

DETAILED AND FABRICATED FOR YOUR JOB...CONNORS REINFORCING BARS

Careful detailing and fabrication are yours when you specify Connors Fabricated Reinforcing Bars. Every phase of our engineering and fabricating operations are co-ordinated to assure accuracy. Connors Reinforcing Bars are available in all grades meeting ASTM standards, including 14s and 18s extra large bars. Let Connors provide you with complete Reinforcing Bar service. Three plants to serve you. Connors Works, P. O. Box 2562, Birmingham, Alabama, Phone 592-8981. West Virginia Works, P. O. Box 118, Huntington, West Virginia, Phone JAckson 9-7171. New Orleans Works, Phone 945-6110.

PORTER

CONNORS STEEL DIVISION
H.K. PORTER COMPANY, INC.



100,000-MILE WARRANTY FOR SUPER DUTY V-8's

THEY'RE HERE!

NEW '62 FORD TRUCKS

Get full-time economy that only starts with Ford's low price!

Meet the trucks that make saving money a full-time business—new Ford Trucks for '62!

In a selection of over 600 models there's a truck that's right for your job, whatever your job . . . trucks that you can buy and operate at lower cost . . . trucks that can save you money mile after mile, load after load, year after year!

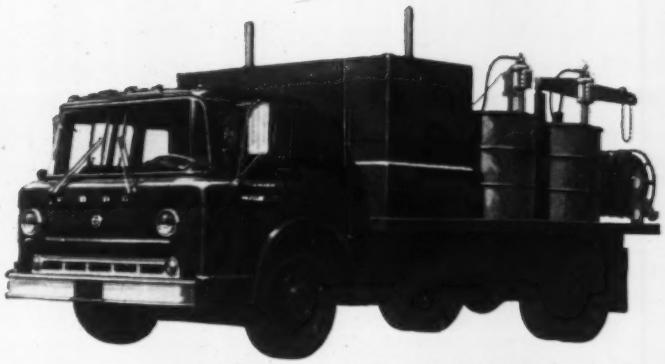
They save on price. They save on gas and oil. They save on tires and on maintenance—wherever there's a way to save! The full record of Ford economy, covering three years of independent tests, is detailed in Ford's Certified Economy Reports. See your Ford Dealer now. Check out the facts, work out a deal, and drive out a truck that saves money . . . full time!

FORD TRUCKS COST LESS

SAVE NOW...SAVE FROM NOW ON!

ECONOMICAL HEAVY DUTY V-8's with 292-, 302- and 332-cu. in. displacement give you tailored-to-the-job economy at much lower prices than you would expect in trucks with engines of this size. Stress-relieved cylinder heads, aluminum alloy pistons and sodium-cooled exhaust valves are but a few of the heavy-duty features you get with these engines.

EXCLUSIVE 100,000-MILE WARRANTY on 401-, 477- and 534-cu. in. Super Duty V-8's is the most liberal in the industry. Each major engine part (including block, heads, crankshaft, valves, pistons, rings), when engine is used in normal service, is warranted by your dealer against defects in material or workmanship. *The warranty covers full cost of replacement parts* for 100,000 miles or 24 months (or 3,000 hours if used as a power source for other than propelling the vehicle), whichever comes first . . . *full labor costs* for 50,000 miles, 12 months or 1,500 hours, sliding percentage scale thereafter.



PROVEN 262-CU. IN. BIG SIX FOR FORD MEDIUMS includes more heavy-duty engine features than any other Six of its size. Never before such long-term durability, reliability, and economy at so low a price.

NEW STYLESIDE BODY FOR 4 X 4 PICKUPS—Ford's rugged 4-wheel drive models are now available with a cab-wide Styleside box that provides over 70 cubic feet of loadspace. Flareside body with running boards is also available.

HEAVY-DUTY CAB, RADIATOR AND SHEET METAL—All Ford Tandems utilize heavy gauge steel, sturdy reinforcements and independent mounting systems to separate radiator, fenders and cab. This stronger construction, with each component individually frame-supported, gives long life, reduces maintenance expense and cuts downtime.

PRODUCTS OF Ford MOTOR COMPANY

DIAMOND BLADE SAWING OF CONCRETE

Case Report: PENNSYLVANIA Hwy.

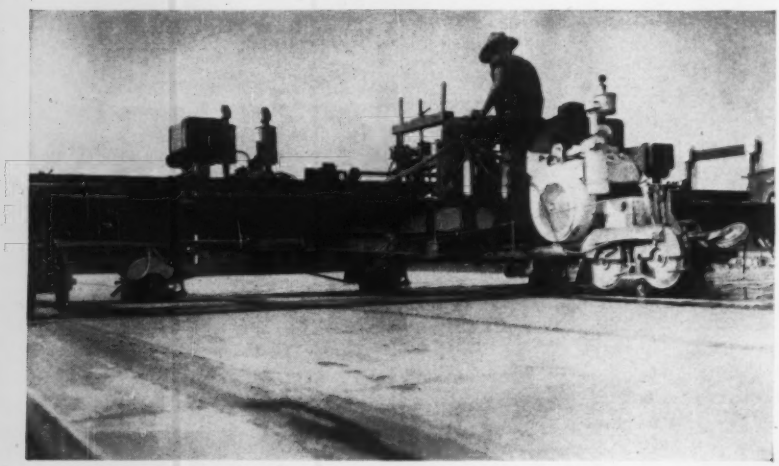
COST-$.073 per linear foot

TYPE OF WORK—Pennsylvania Highway

AGGREGATE—Slag aggregate

SAWING OPERATION—Center line only was sawed—all sawing done with diamond blades.

DIMENSIONS—Longitudinal 3″ x 3/16″.



The case history cited above is typical of diamond blade sawing on concrete highway and runway projects. The cost-per-linear-foot figure is all-inclusive, accounting for labor, equipment, diamond saws, overhead and profit.

Diamond blade sawing makes possible significant reductions in time and labor costs. Precisely controlled joints are cut by high-speed, semi-automatic procedure–maintaining maximum concrete strength and homogeneity in the joint areas–without interfering with or delaying the actual paving operation.

The economy of diamond blade sawing is even more interesting and impressive to the maintenance engineer. He has learned that *sawing is producing the only joint that has proved reduction in maintenance costs.* Further, these savings are running as high as 50%!

Modern diamond blade sawing results are a matter of record based on performance in many states.
For detailed information and field-use reports from state highway officials and contractors, write to Engelhard Hanovia, Inc., for Report #101.

Engelhard Hanovia, Inc. is the leading supplier of SND-MB diamond abrasive, a result of research that has greatly increased diamond cutting efficiency, to diamond blade manufacturers

★ENGELHARD HANOVIA, INC.★
INDUSTRIAL DIAMOND DIVISION
113 ASTOR STREET • NEWARK 2, NEW JERSEY

(Continued from page 68)

▲ **S. C., Columbia**—City, City Hall, plans by Lyles, Bissett, Carlisle & Wolff, 1800 Gervias St., CIVIC AUDITORIUM, $5,000,000. Gilbert Rowe, 1800 Gervais St., structural engr. Fred Franklin & Harold Swygert, 1800 Gervais St., mech. engrs. CD 7/27/60.

▲ **Utah, Salt Lake City**—Salt Lake City Municipal Corp., City-County Bldg., Zone 11, voted $2,500,000 bonds Sept. 12, PUBLIC LIBRARY. Edwards & Daniels, 1407 S. 22 East, Zone 8, archts. Roy McLeese, city engr. CD 8/10/61.

▲ **Utah, Salt Lake City**—Salt Lake Municipal Corp., City-County Bldg., Zone 11, voted $5,000,000 bonds Sept. 12, constr. JOINT CITY-COUNTY PUBLIC SAFETY BLDG. $10,000,000. Roy McLeese, city engr. CD 8/10/61.

▲ **N. S., Halifax**—City, City Hall, CHILDREN'S HOSPITAL, South St. $3,900,000.

▲ **Que., Vaudreuil**—School Bd. of Vaudreuil, 2 and 3 story REGIONAL SCHOOL. $2,000,000.

COMMERCIAL BUILDINGS

▲ **Calif., Los Angeles**—Harvey & Barney Morse, 920 Maple St., plans by Victor Gruen & Assocs., Inc., 135 S. Dohney Dr., Beverly Hills, Calif., CALIFORNIA MART for wholesale trades incl. 13 story, 400,000 sq. ft. OFFICE DISPLAY TOWER A; 20 story DISPLAY-OFFICE TOWER B; 3 underground parking levels; 16 story HOTEL, BANK BLDG., 2 story MOTEL, underground parking swimming pool. $50,000,000. To go ahead 1962.

▲ **Colo., Denver**—University of Denver, Campus, Denver, plans by Joseph E. MacMillian, 2029 E. Evans, 250 family STUDENT APARTMENTS, $3,000,000.

▲ **D. C., Wash.**—Group Health Assoc., Inc., 1225 Vermont Ave. N.W., plans by F. Wallace Dixon & Assoc., 1832 M St. N.W., and Forrest Coile Assoc., 1309 L St. N.W., MEDICAL CENTER BLDG., 2121 Pennsylvania Ave. N.W. $3,500,000.

▲ **D. C., Wash.**—Haisa Corp., c/o Morris Lapidus Harle & Liebman, archts., 940 Lincoln Rd., Miami Beach, Fla., 204 room MOTOR INN, S. Capitol St. between K and I Sts. S.W. $3,000,000.

▲ **D. C., Wash.**,—Tiber Island Corp., (W. C. & A. N. Miller Development Co., and Berens Real Estate Investment Corp.) 4324 49th St. NW, plans by Keyes, Lethbridge & Condon, 1300 Connecticut Ave. NW, 384 luxury APARTMENTS, 86 row houses to be known as Tiber Island, bounded by M. St., Fourth St., N St. and new Washington Channel SW Waterfront, $9,600,000.

▲ **La., Monroe**—St. Francis Hospital, 301 Jackson St., plans by Ellerbe & Co., 333 Sibley St., St. Paul, Minn., 170-bed masonry, brick, structural steel HOSPITAL, 17,000 sq. ft. POWER PLANT. $3,500,000.

▲ **Mo., Florissant**—Samaritan Brotherhood, Inc., c/o Jules M. O'Neil, atty., 580 N. Lindbergh Blvd., 4 story three-wing 200-bed HOSPITAL ADDN., Mullanphy and Shackleford Rds. for Doctors Offices, Pharmacy, Laboratories, etc. $5,000,000. Bids Summer 1962 CD 7/26/61.

▲ **N. J., Darlington (P.O. Ramsey)**—Archdiocese of Newark, 33 Mulberry St., Newark, and Immaculate Conception Seminary, Valley Rd., Darlington, (P.O. Ramsey), plans by Fanning Assocs., 49 Ward St., Paterson, PHILOSOPHY BLDG., Valley Rd. $4,000,000. Saul Shaw & Co., 11 Hill St., Newark, struc. engrs. Fred C. Meyer Assocs., 440 Rochelle Ave., Rochelle Park, elec. engrs. Bids in November. CD 2/20/61.

▲ **N. J., Moorestown**—John Wanamaker, 1300 Market St., Phila., Pa. and Gimbels-Philadelphia, 9th and Market Streets, Phila., Pa., plans by Abbot-Merkt & Co., archts.-engrs., 630 Third Ave., New York 17, N.Y., SHOPPING CENTER, incl. two 190,000 sq. ft. department stores, Routes 73, 41 and 38. $7,000,000-$10,000,000. Young & Banwell, Girard Trust Bldg., Phila., Pa., architects for Wanamaker store only. CD 5/4/61.

▲ **N. J., New Brunswick**—Isaac Arditi, 405 Lexington Ave., New York, N. Y., HOTEL, THEATRE, BOWLING ALLEY, OFFICE and STORES, four block tract bounded by George St., Memorial Park and Richmond-Liberty Streets. $10,000,000.

▲ **N. Y., Jamaica**—Crossway Motor Hotels, Inc., 24 Tarrytown Rd., White Plains, 250-room MOTEL, Idlewild Airport. Over $3,000,000.

▲ **N. Y., Patchogue**—Suffolk Development Corp., 392 E. Main St., plans by Meyer & Kasindorf, 10 So. Middle Neck Rd., Great Neck, 300,000 sq. ft. SHOPPING CENTER, 6 story OFFICE, THEATRE, BOWLING CENTER, parking area, 18 acres, East Main St. between Grove and Evergreen Aves. $5,000,000. Bids soon. CD 4/26/61.

▲ **N. C., Charlotte**—C. D. Spangler Constr. Co., 1028 S. Boulevard, plans by Lyles, Bissett, Carlisle & Wolff, 180 Gervais St., Columbia, S. C., APARTMENT, $3,500,000. Gilbert Roew, 1800 Gervais St., Columbia, S. C., structural engr. Fred Franklin & Harold A. Swygert, 1800 Gervais St., Columbia, S. C., mechanical engrs CD 7/21/60.

▲ **O., Columbus**—Piketon Corp., c/o Louis Goldstein, Old Airport Bldg., Zone 19, plans by Harold S. Schofield, 99 Jahn Dr., Gahanna, 300,000 sq. ft. SHOPPING CENTER, Groveport Pike, near Parsons Ave., 80 units, incl. 40,000 sq. ft. bowling alley, $3,000,000. Benjamin Eisner, 3376 Broadmoor Ave., Zone 13, consult. engrs. Bids late Fall 1961.

(Continued on page 74)

The "B" means we rolled it at our Bethlehem, Pa., plant.

For quick, positive identification of Bethlehem structural steel...

LOOK FOR THIS BRAND

The "L" means we rolled it at our Lackawanna, N. Y., plant.

Steel

for Strength
... Economy
... Versatility

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
Export Sales: Bethlehem Steel Export Corporation

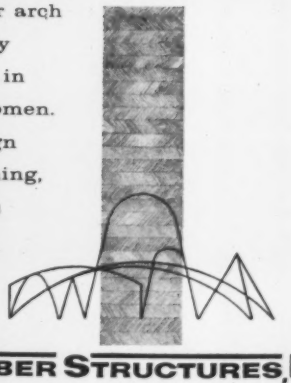
BETHLEHEM STEEL

BETHLEHEM STEEL

Commons Room of Memorial Union Building, Oregon State College, Corvallis, Oregon. Architects: Church, Newberry, Roehr & Schuette, Portland. Engineers: Cooper & Rose, Portland. Contractor: A. V. Peterson Co., Portland.

Space provided: dining hall for over 500 people; kitchen and serving area on upper level; billiard room and 10 bowling alleys on ground floor level. *Structural framing:* glulam arch frames placed side by side on 30' centers and fanning out at 45° from each other; glulam purlins joined to arch frames at an angle and extended to outer walls. *Exterior walls:* reinforced concrete with brick veneer and Indiana limestone trim. *Interior walls:* vertical tongue-and-groove Hemlock on end walls; plaster; window walls. *Floors:* vinyl asbestos tile over precast and pre-tensioned concrete T-beam floor sections; maple floor in bowling alleys. *Heating and ventilating:* Herman Nelson unit ventilators supplied by central heating plant; units are designed for future cooling installations. *Lighting:* fluorescent over bowling alleys; incandescent elsewhere. *Roof:* cement asbestos shingles over Hemlock decking. *Area:* 19,370 square feet. *Cost:* $14.50 per square foot including kitchen equipment. Cost of glulam arch frames, purlins and end truss $0.878 a square foot erected in place.

Impressively beautiful glulam timber arch frames create the warm, friendly atmosphere which remains forever in the memories of college men and women. As a result of the unlimited design possibilities of this structural framing, the exterior appearance harmonizes perfectly with that of an older adjoining building.



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District Representatives in Major Cities Throughout the United States • Member A. I. T. C. and Producers' Council

(Continued from page 72)

▲ **Tex., El Paso**—Dr. Hughes Investments, 3010 Blackburn St., Dallas, plans by Gordon Associates, 3010 Blackburn St., Dallas, 3 ten story Starlite Hills APARTMENT, 396,000 sq. ft. underground parking, masonry swimming pool, 156 unit, $3,000,000.

▲ **Tex., Fort Worth**—W.S.B. Builders, Inc., Weatherford, 500, 1 story, brick veneer RESIDENCES, Elderly Housing Proj. Jenkins Heights, near Lake Worth, $5,000,000—$10,000,000. Carter & Burgess, 1100 Macon St., consult. engrs. Bids 1962.

▲ **Tex., Lubbock**—Citizens National Bank, John A. Hughes, Chrm. Exec. Committee, plans by Butler-Kimmell Co., 412 Ave. M., 12 story, bsmnt., brick BANK and OFFICE, $3,000,000. Bids 1961. CD 3/27/59.

▲ **Wis., Brookfield**—General Merchandise Co., 207 North Milwaukee St., Milwaukee, Zone 2, plans by Miller & Waltz, 777 North Jefferson St., Milwaukee. SHOPPING CENTER, incl. bowling alley, 3 story office, gasoline service station, 2,000 car parking $12,000,000.

▲ **Wis., Milwaukee**—Jared Corp., c/o Rasche, Schroeder & Spransy, archts., 601 West Capitol Dr. DEPARTMENT-FOOD STORE, parking structure. $3,000,000.

INDUSTRIAL BUILDINGS

▲ **Calif., Mojave**—American Potash & Chemical Co., 3000 W. 6 St., Los Angeles, PLANT for manufacture of titanium oxide. $15,000,000. C. F. Braun & Co., 1000 S. Fremont St., Alhambra, consult. engrs.

▲ **Ill., Chester**—Kaiser Aluminum & Chemical Corp., Kaiser Center, 300 Lakeside Dr., Oakland 12, Calif., ALUMINUM REDUCTION PLANT. 300 acre track along Mississippi River, $50,000,000.

▲ **N. J., Pedricktown**—Air Reduction Co., Inc., 150 W. 42nd St., New York, N. Y., MANUFACTURING PLANT, 50 acre site. $3,000,000.

▲ **S.C., Lancaster**—Springs Cotton Mills, Lancaster, 175,000 sq. ft. TEXTILE MILL, $7,500,000. CD 9/2/54.

AMERICANS ABROAD

▲ **Taiwan (Formosa)**—Allied Chemical Corp., 61 Broadway, New York 6, N.Y., U.S.A., Socony Mobil Oil Co., 150 E. 42 St., New York 17, N. Y., U.S.A., and Chinese Petroleum Corp., Taipei, Taiwan (Formosa), PLANT to produce urea and ammonia from Natural gas in Northern Taiwan. $22,500,000.

FOREIGN

▲ **Netherlands**—Shell International Chemicals Co., Ltd., 15 Great Marlborough St., London W 1, England, SYNTHETIC ORGANIC ACIDS PLANT at Pernis Refinery near Rotterdam. $5,600,000.

▲ **Spain**—Energias e Industrias Aragonesas, S.A. Barquillo 1, Madrid, HYDROELECTRIC FACILITIES on upper Aaragon River. $11,000,000.

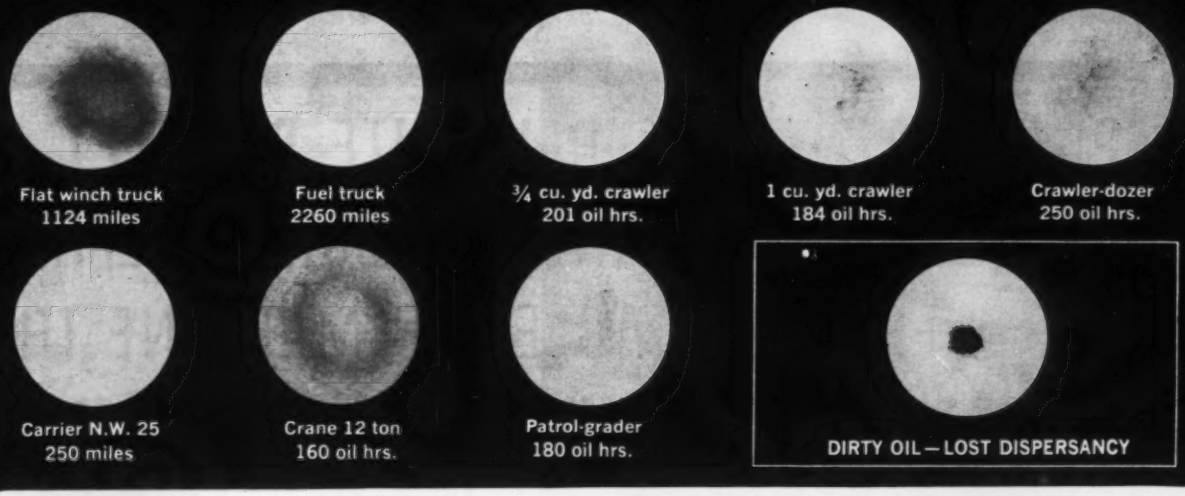
LATIN AMERICA

▲ **ARGENTINA**—Direcc. Nacional Vialidad, Av. Maipu 3, Buenos Aires, ROADS,
177 klms. basic works and wid'n. R. 26 Cerro Dragon Junction with R. 40, Prov. Chubut, $2,500,000.
317 klms. repairs, paving R. 25 Dolavon-LA Herreria, Prov. Chubut, $1,500,000.
132 klms. partial repairs and bridge R. 40 Alto Rio Senguerr-limit w/Santa Cruz Prov., Prov. Chubut, $1,000,000.
180 klms. partial repairs and bridge R. 40 Junction R. 259-Costa, Prov. Chubut, $1,250,000.
34 klms. basic works and paving R. 12 Puerto Constanza-Gualeguaychu, Prov. Entre Rios, $1,250,000.
300 klms. progressive imprvts. bit. treating R. 136, Prov. Entre Rios, $1,875,000.
60 klms. gravel and bit. treating R. 127 Arroyo Burgos-Sauce De Luna, Prov. Entre Rios, $2,250,000.
180 klms. surface imprvts. R. 81 Junction R. 11-Commandante Fontana, Prov. Formosa, $1,125,000.
28 klms. paving R. 34 Rio Zora-Rio de las Piedras, Prov. Jujuy, $1,000,000.
157 klms. basic works and gravel R. 9 Humahua CA-LA Qui ACA, Prov. Jujuy, $3,125,000.

▲ **ARGENTINA**—Direcc. Nacional Vialidad, Av. Maipu 3, Buenos Aires, ROADS,
26 klms. basic work and paving R.7 San Martin-Rodeo de La Cruz, Prov. Mendoza, $1,000,000.
10 klms. basic work and paving (double lanes) R.7 Rodeo de la Cruz La Purisima, Prov. Mendoza, $1,250,000.
44 klms. basic work and paving (new section) R.7 Tres Esquinas-Poterillos, Prov. Mendoza, $1,687,000.
50 klms. remodelling present basic work and paving R.7 Polvaredas-Las Cuevas, Prov. Mendoza. $1,500,000.
77 klms. basic work and paving R.38 La Rioja-Limit w/Catamarca Prov., Prov. Lamrioja, $1,500,000.
65 klms. basic works and bit. treating R.143 Trebolares-Larrou De, Prov. La Pampa, $1,250,000.
132 klms. basic work and bit. treating R.143 Catex-Telen, Prov. La Pampa, $2,500,000.
193 klms. basic work and gravel. R.152 Caranchos-La Japonesa, Prov. La Pampa. $4,500,000.
70 klms. basic work and paving R.38 Patquia La Rioja, Prov. La Rioja, $1,275,000.
80 klms. basis work R.60 Alpachinche-limit w/Catamarca Prov, Prov. La Rioja, $1,000,000.
55 klms. basic work and paving R.74 Arroyo Santa Elena-Nonogasta, Prov. La Rioja, $1,250,000.

For additional reports see CONSTRUCTION DAILY NEWSLETTER

(Proposal Advertisements see pp. 84 to 87)



The Oilprints above were taken from nine different engines. The first eight oil samples are from engines using Shell Rotella T Oil 20W/40. Compare their cleanliness with the sample in the box. The oil sample in the box is heavily contaminated, a potential source of trouble.

EVIDENCE:

"These Oilprints show how Shell Rotella T Oil 20W/40 helped us solve a major overhaul problem in a climate that ranges from sub-zero to sizzling hot."

—says successful Michigan excavation contractor.

A Michigan contractor* switched his entire fleet to Rotella® T Oil 20W/40—80 vehicles, 8 different types of equipment.

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"STICKING valves were causing premature engine failure," reports this contractor. "Then we tried Shell's Rotella T Oil 20W/40.

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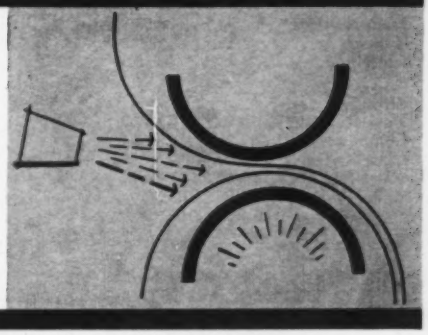

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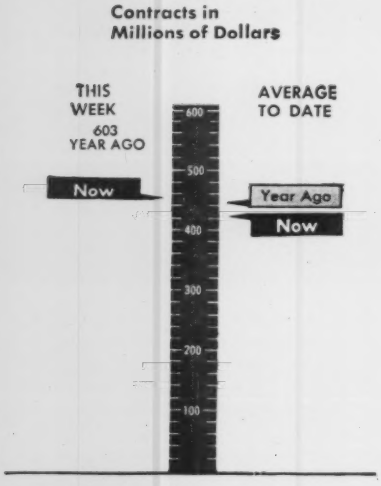
Construction Scoreboard

This Week . . .



AMOUNT OF CONTRACTS LET

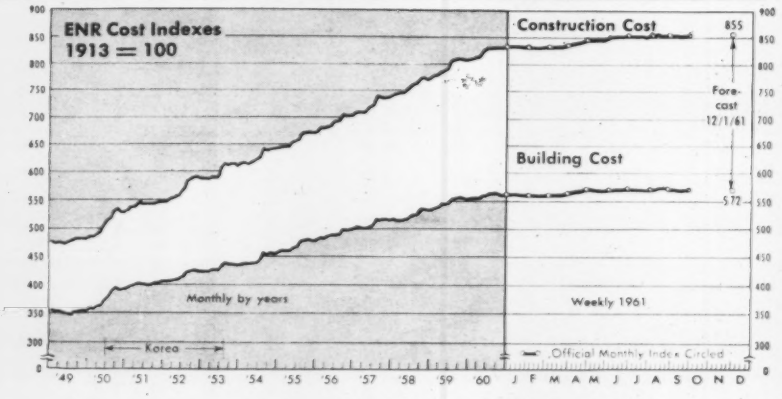
Contracts Awarded In 50 States By Type	This Week	Cum. 40 wks 1961	Chge '60-'61 %
	millions		
All Heavy Construction	$450.5	$17,140.5	− 4
By Ownership			
PRIVATE	243.4	8,389.3	−12
PUBLIC	207.1	8,751.2	+ 6
State & Municipal	188.5	6,820.5	+ 6
Federal	18.6	1,930.7	+ 4
By Type of Work			
PUBLIC			
Waterworks	5.6	301.0	−18
Sewerage	20.4	591.2	+31
Bridges*	11.7	504.5	−22
Highways	80.9	2,979.0	+14
Earthwork, Dams & Waterways	7.4	625.5	+ 2
Buildings:			
Excl. Housing	54.1	2,063.8	+ 9
Housing	15.7	650.2	+22
Unclassified	11.4	1,036.5	−11
PRIVATE			
Buildings:			
Mass Housing	116.7	3,889.2	−14
Commercial	25.6	2,013.4	+ 5
Industrial	90.1	2,128.0	− 1
Unclassified	10.9	358.2	−61

*Includes Private bridges

NOTE: Minimum size projects included are: Waterworks and waterways, $53,000; other public works, $88,000; industrial buildings, $110,000; other buildings, $400,000.

NEW CONSTRUCTION CAPITAL

	Week of Sept. 28	Cum. 39 wks 1961	Chge '60-'61 %
	millions		
Corporate Securities	$ 76.4	$2,528.6	+ 7
State & Municipal:			
All Except Housing	192.8	5,045.4	+0.5
Housing	0	98.9	−48
Federal Loans	1.6	193.0	+23
Federal Aid	150.0	3,463.6	+27
Total Nonfederal	$420.8	$11,329.5	+ 8
Federal Appropriations:			
Projects in U. S.	$1,389.2	$3,132.4	+23
Outside U. S.	1.0	89.9	−43
Total New Capital	$1,811.0	$14,551.8	+11



ENR INDEXES (1913 = 100), 20-cities' average	Week of Sept. 28 1961	% Change from Aug. 31 1961	% Change from Sept. 29 1960
Construction Cost	854.48*	+0.02	+2.3
Building Cost	570.55*	−0.1	+1.6

* Official Monthly Index for October, 1961

To convert above indexes to 1926 = 100: Divide Construction Cost by 2.080; Building Cost by 1.850.
1949 = 100: Divide Construction Cost by 4.770; Building Cost by 3.518.

This Month . . .

WAGE RATES, 20-cities' average	Oct. 1961	% Change from Sept. 1961	% Change from Oct. 1960
Common	2.871	+0.3	+4.8
Skilled (average 3 trades)	4.245	+0.2	+3.8
Bricklayers	4.443	+0.2	+3.2
Structural Ironworkers	4.312	+0.2	+4.2
Carpenters	3.983	+0.2	+4.2
Equipment operators (average three types)	3.884	+0.2	+4.5
MATERIAL PRICES, 20-cities' average			
Structural Steel (average 3 mills), per cwt	5.50	0	0
Lumber, 2x4 Fir, per M fbm	115.40	−0.7	−1.1
Lumber, 2x4 Pine, per M fbm	106.70	−0.3	−1.9
Cement, bulk, per bbl	4.03	0	0
Sand, per ton	2.355	0	−0.3
Ready-mixed concrete, per cu yd	14.21	0	−1.0
Gypsum sheathing, ½"x2'x8', per Msf*	61.52	−0.1	−1.5
Fiber board sheathing, ½" sq. ed., per Msf*	70.84	+0.6	−0.1
Mineral wool insulation, 3' batts, per Msf*	66.52	−0.6	−2.3
Crushed stone, 1½", per ton, CL	2.711	0	+2.4
Concrete blocks, sand/gravel, 8"x8"x16", each*	2.258	−0.9	−1.2

Latest Month . . .

	Sept. 1961	Aug. 1961	Sept. 1960
Brick, common per M	41.28	0	+0.6
Lime, hydrated finishing, per ton, CL	39.28	−0.4	+2.6
Structural clay tile, 3x12x12", per M, 2,000 up*	193.35	0	+2.7
Vitrified clay sewer pipe, std 12", per ft	1.456	+0.1	+3.3
Concrete sewer pipe, 12", per ft	1.451	0	+2.3

*Delivered, trucklots

ENR INDEX REVIEW

	Construction Cost		Building Cost		Volume	
1960	1913 = 100	1949 = 100	1913 = 100	1949 = 100	1913 = 100	1949 = 100
Sept.	830.92	174.19	562.79	159.98	603	174
Oct.	829.58	173.90	561.45	159.60	591	171
Nov.	830.09	174.01	561.11	159.50	609	176
Dec.	830.61	174.12	561.50	159.61	503	145
1960 Average	823.55	172.64	559.43	159.02	597	172
1961						
Jan.	834.32	174.90	562.91	160.01	557	161
Feb.	834.27	174.89	562.93	160.02	464	134
Mar.	834.16	174.87	562.89	160.01	519	150
Apr.	837.58*	175.58*	565.19*	160.66*	598*	173*
May	847.32*	177.62*	568.99*	161.74*	609*	176*
June	850.38*	178.28*	570.17*	162.07*	634*	183*
July	853.64*	178.95*	571.66*	162.50*	609*	176*
Aug.	854.09*	179.05*	570.86*	162.27*	587*	170*
Sept.	854.01*	179.03*	571.34*	162.40*	549*	159*
Oct.	854.48*	179.72*	570.55*	162.18*	...	...

* Subject to adjustment due to retroactive wage increases.

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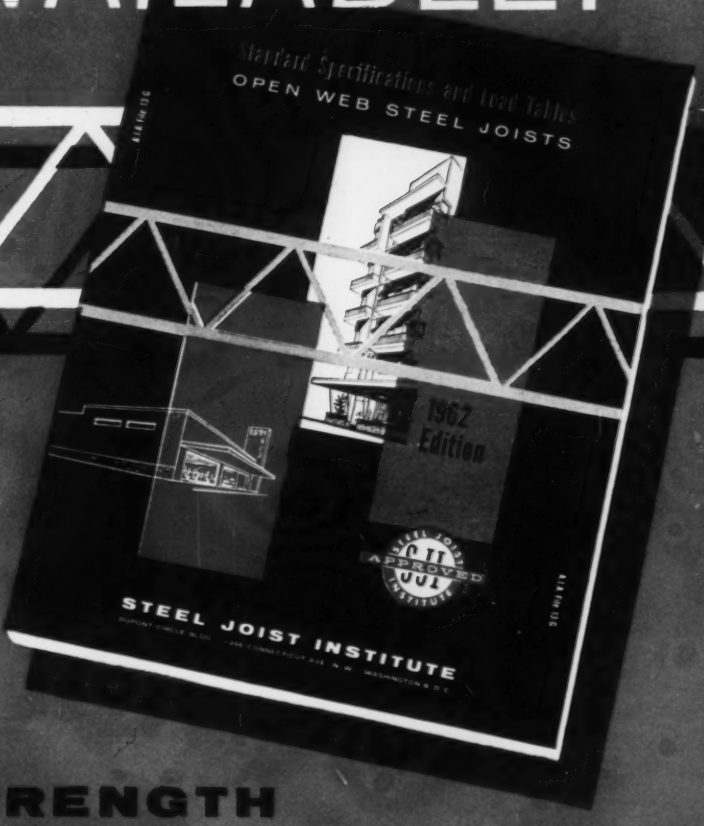

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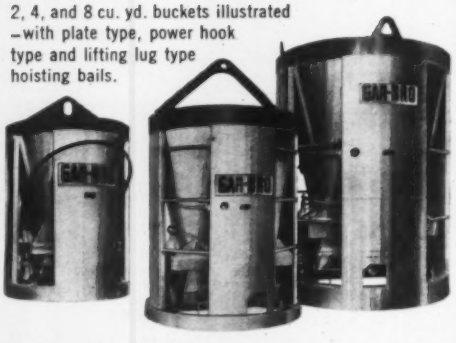

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Housing Contracts Gain in September

Private mass housing ran counter to the general decline in construction contract volume awarded in September. Heavy construction contracts of $1.7 billion were 7% below the pace of both August 1961 and September 1960.

Last month's volume brought the nine-month contract total to $16.7 billion, a 3% gain over the same period last year. The nine-month gain compares to one of only 2% at the end of the first eight months.

Unclassified private construction—spurred by gas pipeline awards—bucked the late summer decline and showed a sharp increase. Mass housing volume topped both August and a year ago by 16%, narrowing the year-to-year gap to 15% from a spread of 18% at the end of eight months. Sewerage awards continued their climb, registering a 29% gain over last year. Earthwork-dams-waterways also posted gains both over August and for the nine months.

Private construction contracts of $862 million exceeded public volume for the first time since May, despite the sluggish pace of the industrial segment and a slowing of commercial awards from their brisk pace of early summer. Total private volume in September slipped only 1% below August. The nine-month total of $8.1 billion in new contracts is now 10% behind the same period of last year.

Public construction activity fell off more sharply than private. Federal work dropped well below both August and September 1960. Total public contracts of $8.5 billion in the first nine months now top last year by 5%.

State and municipal contracts for the first nine months total $6.6 billion, 6% above last year. Federal awards of $1.9 billion are 4% above a year ago.

Private mass housing qualifies as the brightest spot in September's construction market. Four states each reported awards of more than $50 million in September—Pennsylvania, New York, California and New Jersey.

Most disappointing was the showing of industrial building, now 4% behind one year ago with slightly more than $2 billion in contracts awarded during the first nine months. At the end of August, industrial awards topped 1960's first eight months by 2%.

This leaves commercial building as the only type of private construction showing a gain for the first nine months. For six consecutive months, commercial construction contracts hit a rate of $50 million or more a week, thereby setting a new record of almost $2 billion.

In the public sector, only three types of construction – waterworks, bridges and unclassified – failed to top last year's first nine months. Highways are up 13% with a total of $2.9 billion and sewerage contracts are up 29%. Public housing is 20% ahead of last year.

Construction Costs Rise Slightly

After a brief interruption in September, the parade of new highs in construction moves forward again. ENR's 20-Cities Construction Cost Index rises a razor-thin, 0.02% in October, to 854.48. The Construction Cost Index measures cost trends of basic materials and common labor bought by contractors. The index is based on average cost in 1913 as 100.

The increase reflects a 16.5-cent hourly wage boost for common labor on heavy construction projects in Pittsburgh, and a 15-cent increase for building construction common laborers in Birmingham. These boosts outweighed the effects of lower lumber prices in several major construction markets.

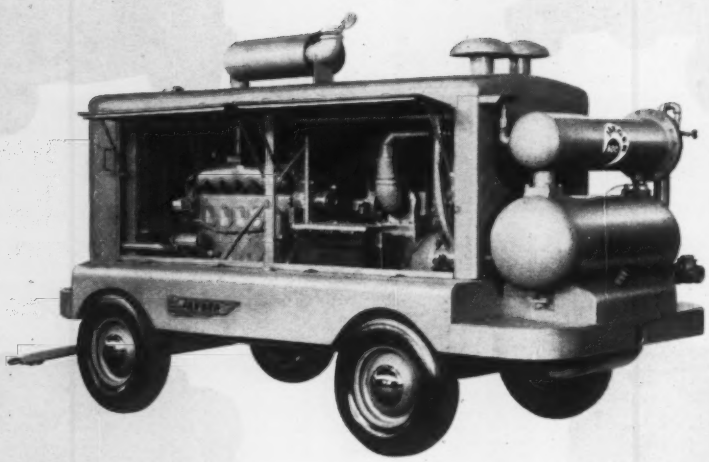
In contrast to construction, ENR's 20-Cities Building Cost Index drops slightly this month. This index measures materials and skilled labor cost trends. It weighs wage rates less heavily than its companion index, so the lower lumber prices offset several increases in wages for key skilled trades.

At 570.55, the building index for October trails September by 0.1%.

Engineering Construction Contracts for September

	September, 1961								Nine Months			
	New England	Middle Atlantic	South	Mid-West	Mississippi to Rockies	Far West	Total U. S.	% Change '60 to '61 (Av. Wk.)	U. S. Cumulative 1961 (39 wks.)	1960 (39 wks.)	% Change '60 to '61	Canada Sept. 1961
Public Works, Total	**43,596**	**173,944**	**166,171**	**123,061**	**146,394**	**141,889**	**795,055**	**− 7**	**8,544,016**	**8,118,012**	**+ 5**	**90,440**
Waterworks	76	2,500	3,273	10,035	2,936	7,009	25,889	−34	295,406	362,780	−19	3,273
Sewerage	1,220	20,714	11,446	11,650	6,583	17,277	68,890	+68	570,915	442,778	+29	4,430
Bridges	533	17,510	9,450	7,913	5,684	1,566	42,656	−45	492,625	634,658	−22	5,006
Earthwork, waterways	1,461	2,781	2,701	2,892	21,728	9,523	41,086	−26	616,169	607,350	+ 2	2,352
Streets and roads	21,118	72,461	66,098	53,305	57,350	31,630	301,962	− 2	2,897,723	2,554,114	+13	12,382
Buildings: Residential	1,208	12,899	9,621	6,168	16,962	3,105	49,963	−20	634,254	530,578	+20	2,493
Other	15,905	37,502	31,789	25,129	21,479	51,035	182,839	− 4	2,009,646	1,841,550	+ 9	35,930
Unclassified	2,075	7,577	31,793	5,969	13,672	20,684	81,770	− 5	1,025,278	1,144,195	−10	24,574
State & Municipal	40,944	160,126	130,885	118,924	105,792	126,932	683,593	− 4	6,631,922	6,280,454	+ 6	61,807
Federal	2,652	13,818	35,286	4,137	40,602	14,957	111,462	−24	1,912,094	1,837,558	+ 4	28,633
Private, Total	**34,070**	**305,321**	**106,508**	**87,392**	**203,167**	**125,610**	**862,068**	**− 7**	**8,145,950**	**9,090,190**	**−10**	**56,326**
Bridges								−100	653	2,936	−78	
Buildings: Industrial	8,543	39,672	14,132	19,512	35,615	21,190	138,664	−47	2,037,886	2,130,485	− 4	18,663
Mass housing	10,873	213,389	56,349	37,603	80,014	68,036	472,264	+16	3,772,498	4,425,074	−15	7,751
Commercial	13,654	52,031	19,128	24,174	56,002	34,958	200,007	−10	1,987,691	1,874,347	+ 6	24,605
Unclassified	1,000	229	16,899	6,103	25,476	1,426	51,133	+32	347,222	657,348	−47	5,307
Total, Sept., 1961—4 wks.	**77,666**	**479,265**	**272,679**	**210,453**	**349,561**	**267,499**	**1,657,123**	**− 7**				**146,766**
Total, Aug., 1961—5 wks.	117,558	512,845	427,935	313,273	497,239	351,107	2,219,957	....			....	254,537
Total, Sept., 1960—5 wks.	170,028	547,441	274,551	361,574	578,349	300,482	2,232,425	....			....	157,388
Nine mos., 1961 (39 wks.)	**805,810**	**3,900,786**	**2,860,729**	**2,504,875**	**3,736,908**	**2,880,858**	.....	....	**16,689,966**	.....	**− 3**	**1,319,309**
Nine mos., 1960 (39 wks.)	1,084,997	4,127,545	2,685,256	2,608,856	3,977,940	2,723,608	.....	....	.....	17,208,202	....	1,421,280
% Change '60 to '61	−26	−5	+7	−4	−6	+6	.....	....	.....	.....	....	−7

ENGINEERING NEWS-RECORD *reports U. S. (50 states) construction projects of the following minimum costs—Waterworks, excavation, drainage and irrigation, $55,000; other public works, $88,000; industrial buildings, $110,000; other buildings, $100,000.*



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1. **Every 30 days:** "Common-sense" maintenance. Air, fuel and oil filters cleaned and checked. Gauges and other controls inspected.
2. **Every 300 to 500 hours:** Compressor oil changed.
3. **Every 5,000 hours:** Engine overhaul.
4. **Every 10,000 hours:** Compressor overhaul.

At 10,000 hours, the only compressor replacement parts normally required are vanes, the oil seal, gasket and occasionally a bearing. With the same sensible maintenance program, you can expect the same trouble-free service from soundly engineered, quality-built Jaeger compressors.

And there's a lot more for your money you can count on, too. For example, the fuel-saving way that they work. Jaeger rotaries — 75 to 900 cfm — maintain steady, full air pressure at slower engine speeds than other leading rotaries. (Even though almost all 365, 600 and 900 compressors use the exact same engines!) It just stands to reason, when engine pistons and compressor vanes travel fewer miles at slower speeds, they wear less and use less fuel.

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Labor Board Closes Boycott Loophole

NLRB rules Landrum-Griffin law makes execution of hot-cargo clauses as well as enforcement unlawful

The National Labor Relations Board last week attempted to make some order out of the chaos that still exists on the use of hot-cargo clauses in labor contracts.

In a unanimous decision, it ruled that under the Landrum-Griffin law:

- A labor contract clause that exempts employees from performing work in connection with products or materials coming from or going to an employer who is engaged in a labor dispute is an unlawful hot-cargo clause.
- Not only is the clause void and unenforceable, but the mere adoption of the clause is itself an unfair labor practice. Efforts to enforce or implement the clause are not essential to establish a violation of the law.

The decision is significant because it puts the Board squarely behind the Landrum-Griffin legislators who said they intended, however ambiguous the language they used, to forbid and wipe out hot-cargo clauses of every kind.

The labor contract clause that caused the present controversy was one negotiated by a teamsters local union and the American Feed Co. to replace an existing hot-cargo clause that was clearly illegal under the Landrum-Griffin law. Under that law, it is unlawful for an employer and a union to make an agreement whereby the employer agrees not to handle certain products or to cease doing business with another person. The law makes such boycott or hot-cargo agreement both "unenforceable and void."

The teamsters' new clause provided, in part:

"There is hereby excluded from the job duties, course of employment or work of employees covered by this agreement, any work whatsoever on goods, products or materials coming from or going to the premises of an employer where there is a controversy with a union."

"The NLRB held that the clause is an "unlawful hot-cargo clause." Although the clause does not contain the affirmative employer commitment the law forbids, the Board apparently felt that the employer, by accepting the clause, had effectively agreed to boycott employers that the union objected to.

The Board then went on to hold that hot-cargo clauses are "unlawful at inception without evidence of implementation either by request or coercion." The mere "act of entering into, signing, executing or making" such a contract, the Board said, is a violation of the law. The ruling, in this respect, reversed the trial examiner, who had held that execution of the clause was not illegal "per se."

The Board took the position that Congress, in putting the hot-cargo ban in the Landrum-Griffin law, intended to close the secondary boycott loophole created by the Supreme Court in a 1958 construction industry decision known as the Sand Door case. That case involved the refusal of carpenters to install nonunion doors on a Los Angeles hospital project, basing their refusal on a labor contract clause that said "workmen shall not be required to handle nonunion material."

The Supreme Court refused to rule on the validity of the clause and went only as far as to say that the union could not try to enforce the clause by a strike. But it held that the law does not prevent an employer from accepting a hot-cargo clause and honoring it voluntarily or as a result of union coercion on the employer short of a strike.

The result was a loophole that permitted unions to accomplish indirectly what the law forbids them to do directly. It left employers exposed, the Board said, to "such pressures and coercion as a union might exert to obtain contractual assent to prospective secondary boycotts." And the mere existence of a hot-cargo clause, the Board noted, creates "moral suasion against an employer."

The only way to close the loophole, the Board said, is to attack hot-cargo clauses at the "initial stage, the making or entering into a contract." That is what Congress intended to do and did do, the Board ruled.

Engineering Unions Seek Unity

Several independent engineering unions that continue to spurn the idea of affiliation with the AFL-CIO are still trying to find a central and common voice of their own.

Seven associations have now reached the point of drafting a constitution for a new federation. If such a federation is formed, it will help fill the void left by the dissolution of Engineers and Scientists of America and by the organizational failure of what was originally known as Engineers and Scientists Guild.

The seven groups have held two "engineering unification" meetings—the last one in Los Angeles on September 23 and 24. "Progress on the new constitution is good," they reported. "No basic problems exist."

In an interim report issued by the "committee on engineering unification" last week, leaders of the unity movement said:

"The intent of these meetings is to resolve details in a required constitution in order to provide a single association capable of solving the problems of the basic needs of the employed engineer in industry and governmental service. Each of the groups realized that these needs can be better filled when resources are pooled, reserving to themselves those activities more properly performed by the groups."

The groups participating in the unity movement are: San Diego, Pomona Valley, and Civic Center chapters of the Engineers and Architects Association (EAA), Engineers and Scientists Guild—Lockheed Section (ESG), Southern California Professional Engineering Association (SPEA), with Seattle Professional Engineering Employees Association (SPEEA) as an observer. Engineers and Scientists of California (ESC) was not represented at the last meeting but is being kept advised of the progress made.

Each group had at one time been a member of ESA and all but two were later to become associated with the ESG movement.

Two constitution coordinators, Henry Schultz of EAA and Max Mayfield of SPEA, are incorporating into a single document the provisions that have been proposed for a new constitution. The document will be considered at the next meeting, which is now scheduled for early December.

Prof. Arthur Carstends of the Industrial Relations Department of the University of California, Los Angeles, has attended all sessions of the constitutional meetings.

Bids: October 26, 1961

New York State Road Work

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS,

OFFICIAL PROPOSALS

ALBANY, N. Y.—Pursuant to the provisions of the Highway Law, and special provisions for projects financed with Federal Aid Funds, sealed proposals will be received until ten-thirty o'clock A.M., advanced standard time, which is nine-thirty o'clock

OFFICIAL PROPOSALS

A.M., eastern standard time, on the 26th day of October 1961, by Henry A. Cohen, Director, Bureau of Contracts, 12th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following projects:

County	Contract No.	Name	Miles	Type	Deposit	Estimated Cost of Work
DISTRICT No. 1, F. J. FULLER, District Engineer, 353 Broadway, Albany 1, New York						
Saratoga (Int. Trg. Rte. 87)	FISH 61-20	Interstate Route 502, Saratoga Springs to Lake Elizabeth Proj. I-IG-87-3(47)	4.19 (3.29 Acc.)	9" Cement Concrete Pavt. 2 @ 24' Var.=5.31 Mi.; Asphalt Conc.=2.07 Mi.; Misc. Work=0.10 Mi.; 2 Hwy. Gr. Sep. Comp. Plate Girder; 4 Hwy Gr. Seps. Comp. Beam; 2 RR Gr. Seps. Comp. Beam	$265,000 Plans $10	$4,812,000
Schenectady (Int. Trg. Rte. 890)	FITS 61-21	Interstate Route Connection 550 (Michigan Ave. to N. Y. State Thruway, FIC 60-18, FISH 60-9, FISH 58-20). Proj. I-890-5(18)	1.63 (0.62 Acc.)	Traffic Signs and Delineators	$1,000 Plans $5	29,000
DISTRICT No. 3, E. E. TOWLSON, District Engineer, 333 E. Washington Street, Syracuse, New York						
Oswego	FASS 61-13	Salisbury Street (County Road 48) (Sandy Creek and Lacona) Proj. S-617(1)	0.85 (0.06 Acc.)	Asphalt Concrete Ty. 1A	$13,000 Plans $5	237,000
Seneca (Rte. 96)	FARC 61-30	Waterloo Village (Fayette St.) S.H. 1399; Waterloo Vil., S.H. 1211; Waterloo Vil., S.H. 1211A Proj. F-626(7)	0.47	Asphalt Concrete Ty. 2A I-Beam Bridge Widening 2 Prestressed Concrete Bridges	$25,000 Plans $5	456,000
DISTRICT No. 4, B. F. PERRY, District Engineer, Barge Canal Terminal, Rochester 1, New York						
Monroe (Int. Trg. Rte. 490)	FISH 61-15 FARAE 61-1 FARC 61-83	Int. Rte. Conn. 580 Rochester Western Expressway (West Side Drive to Buffalo Road); Rochester Airport Expressway, Part 1 (FAI Conn. 580 to Chili Avenue); Chili Rd. Part 1, S.H. 254; Chili Rd. Part 2, S.H. 255 Proj. I-IG-490-2(22); U-1103(3); U-231(18)	2.69 (3.36 Acc.)	9" Cement Conc. Pavt., 2 @ 24' Var.=4.7 Mi.; Asph. Concrete Type 1A=1.19 Mi.; Misc. Work=0.16 Mi.; 4 Brs.—Twin Reinf. Conc. Closed Box; 5 Hwy. Gr. Seps. Comp. I-Beam; 2 RR Gr. Seps. Comp. Plate Girder	$230,000 Plans $10	4,013,000
Monroe (Int. Trg. Rte. 490)	FIRC 61-147	Int. Rte. Conn. 580 (Rochester-Bushnell Basin, Parts 1 & 2, FASH 54-1 & FISH 56-9) Proj. I-490-2(30)	5.19	Chain Link Fencing	$8,000 Plans $5	149,000
Monroe (Int. Trg. Rte. 490)	FIC 61-19	Int. Rte. Conn. 580 Rochester Western Expressway (Rochester City Line to Mount Read Blvd.) Proj. I-490-2(26)	0.87 (1.19 Acc.)	9" Cement Conc. Pavt. 2 @ 36' & 48'=0.73 Mi.; Asphalt Conc.=1.19 Mi.; R.R. G.S. Plate Girder Hwy. Gr. Sep. Comp. I-Beam	$80,000 Plans $5	1,463,000
Monroe (Int. Trg. Rte. 490)	FIM 61-6	Int. Rte. Conn. 580 (Rochester-Bushnell Basin Pt. 3, FISH 58-16) Proj. I-490-2(31)	0.05	Sprayed Urethane Bridge Insulation	$1,200 Plans $5	21,000
Orleans	FASS 61-12	West Lee Street Rd., County Rds. Nos. 92 & 81 Proj. S-242(4)	4.74	Asphalt Concrete	$23,000 Plans $5	411,000
DISTRICT No. 8, M. N. SINACORI, District Engineer, Pleasant Valley Road, Poughkeepsie, New York						
Dutchess (Rtes. 22, 55)	FATS 61-23	Billings-Poughquag, S.H. 8525; Stonehouse-Pawling, S.H. 1677; Pawling-Patterson, S.H. 343; Pawling Village, S.H. 5009; Stonehouse-Stormville, S.H. 1162 Proj. F-1025(4); F-625(6); F-350(25)	8.23 (0.57 Acc.)	Traffic Signs	$2,000 Plans $5	36,000
DISTRICT No. 9, J. C. FREDERICK, District Engineer, 71 Frederick Street, Binghamton, New York						
Sullivan (Rte. 17)	FARC 61-132	Liberty-County Line, Part 1, S.H. 5223 Liberty-County Line, Part 2, S.H. 5234 Proj. F-336(17)	3.94 (3.76 Acc.)	9" Cement Concrete Pavt., 2 @ 24' W.=3.38 Mi.; Asphalt Conc.=2.93 Mi.; Top Course Broken Stone B.D.S.T.=1.28 Mi.; Fdn. Course Granular Material=0.11 Mi.; 3 Hwy. Gr. Seps. Comp. I-Beam	$245,000 Plans $5	4,475,000
DISTRICT No. 10, A. M. SARR, District Engineer, 325 W. Main Street, Babylon, L. I., New York						
Bronx (Int. Trg. Rte. 78)	FICBERC 61-1 FITNERC 61-1	Int. Rte. Conn. 513, Contract 5 Cross Bronx Expressway: Throgs Neck Expressway Proj. I-78-1(65)	2.65 (5.04 Acc.)	Roadside Development	$8,000 Plans $5	147,000
Nassau (Rte. 27)	RC 61-150	Conduit Boulevard, Part 3, S.H. 1699A	1.58	Reducing Width of Mall	$6,000 Plans $5	108,000
Queens (Int. Trg. Rte. 678)	FIWE 61-2	Int. Rte. Conn. 515 Whitestone Expressway—Contract 2 (Flushing River Bridge and Approaches) Proj. EI-678-1(67)	0.60 (0.24 Acc.)	Plate Girder Bridge, Approaches & Ramps, Conc. Deck Rdway.=0.72 Mi.; Conc. Pavement=0.10 Mi.; Misc. Work=0.02 Mi.	$350,000 Plans $10	6,069,000
Queens	FAVWE 61-4	Van Wyck Expwy. Ext., Contract 3, (Kew Gardens Interchange) Proj. U-1085(22)	0.57 (1.03 Acc.)	9" Cement Concrete Pvt., 2 @ 48' Var.=1.26 Mi.; Asphalt Conc.=0.15 Mi.; Misc. Work=0.19 Mi.; 3 Comp. I-Beam & Plate Gird. Viads.; 2 Comp. I-Beam Viads.; 1 Hwy. Gr. Sep. Comp. I-Beam; 1 Ped. Overpass Plate Girder	$230,000 Plans $10	4,171,000
Queens (Int. Trg. Rte. 495)	FAGCP 61-5 FIHHE 61-2	Grand Central Pkwy., Section 2, Contract 1 (Roosevelt Ave. to 77th Avenue), Int. Rte. Conn. 514 (Grand Central Pkwy.-Horace Harding Interchange) Proj. U-UG-899(5); I-495-1(48)	3.72 (5.42 Acc.)	8" & 9" Cement Conc. Pavement, 2 @ 48'=3.14 Mi.; 8" & 9" Cement Conc. Pavt. Var.=4.75 Mi.; Asph. Conc.=0.67 Mi.; Misc. Work=0.58 Mi.; Riveted Steel Rig. Fr. Structure Welded Thru Pl. Gird. Struct.; 2 Ped. Overpass Comp. WF Beam; 2 Ped. Overpass WF Beam; 1 Ped. Overpass Welded Plate Girder; 3 Comp. WF Cantilever Suspension; 1 WF Beam Plus Alterations; Widen Exist. WF Beam Br.	$570,000 Plans $10	10,377,000
Queens	FAGCP 61-6	Grand Central Pkwy., Section 1, Contract 1 (Brooklyn-Queens Expwy. to Northern Blvd. Interchange) Proj. U-899(4)	2.67 (4.23 Acc.)	8" Cement Conc. Pavt., 2 @ 48' Var.=4.47 Mi. Asph. Concrete Pavement=2.29 Mi.; Misc. Work=0.14 Mi.; 3 Hwy. Gr. Seps. Comp. I-Beam; 3 Ped. Overpass I-Beam Rehabilitation of I-Beam and Conc. Rigid Fr. Underpass; Rehabilitation of Comp. I-Beam & Girder Viaduct	$650,000 Plans $10	11,290,000

Any projects in this letting that are on the Federal Aid highway systems are subject to the provisions of the "Federal Aid Highway Act. of 1956", being Public Law 627, 84th Congress, approved June 29, 1956, and are also subject to the applicable New York State statutes.

In compliance with the provisions of Section 115 (Prevailing Rate of Wage), Public Law 627, the minimum wages to be paid laborers and mechanics are included in wage schedules that are set out in the bid proposal.

Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts, Albany, N. Y., and at the office of the District Engineers noted above, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

If the deposit is $10.00 or more, full refund for one copy of the plans and specifications will be made to a bidder for the particular project, if such plans and specifications are returned in good condition within 30 days after the award of the contract or after the rejection of the proposal. The successful bidder is not required to return the copy of the plans and specifications in order to be entitled to such refund. If the deposit is $10.00 or more, partial refund will be made for the return of all other copies of plans and specifications in good condition within 30 days after the award of the contract or the rejection of the proposal.

Special attention of bidders is called to "Information for Bidders" in the Public Works Specifications, and to the special provisions applying to projects financed with federal funds. Award of a contract is subject to priorities and allocations under the Defense Production Act of 1950, as Amended, and all regulations issued thereunder.

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the order of the "State of New York, Department of Public Works" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bid deposit, the execution of the contract and bond shall conform to the provisions of the Highway Law, as set forth in the "Information for Bidders".

The right is reserved to reject any or all bids.

J. BURCH McMORRAN
SUPT. OF PUBLIC WORKS

OFFICIAL PROPOSALS

Bids: October 30, 1961

Indus Basin Project West Pakistan Water and Power Development Authority Advance Notice of Intent to Invite Tenders for the Procurement of Butterfly Valves

In connection with the construction of a number of large canals and appurtenant structures to be undertaken as a part of the Indus Basin Project in West Pakistan, the above Authority intends to call for tenders for the furnishing of a number of butterfly valves with manual operating mechanisms. The valves and operators will be installed in silt ejection structures to control the ejection of silt from the canals. The procurement of the butterfly valves and operators will be financed through the Indus Basin Development Fund which will be administered by the International Bank for Reconstruction and Development (World Bank).

The work will consist of furnishing all labor, services, materials, plant and equipment required to supply, f.o.b. manufacturer's plant, the required butterfly valves. The valves will be of the horizontal shaft, flanged-type and in the size range of from 48 to 60 inches in diameter. The valves will have metal seats and seals and are to be designed for operation under a head differential of approximately 25 feet. Each valve is to be furnished complete with manual operating mechanism, operating stem, stem guides and gearing. Approximately 28 valves will be required in the initial Tender covering valves for the Trimmu-Sidhnai Link Canal, and additional butterfly valves of a similar type will be procured for other link canals periodically in the future.

Invitations to submit Tenders, along with Specifications for the work, will be issued only to firms presenting satisfactory evidence of having successfully produced equipment of a similar nature. Those firms who wish their names to be included on a list to receive the Contract Documents and Specifications are requested to submit the following information to the Authority's Consultants, Tipton and Kalmbach, Inc., at Post Office Box 589, Lahore, West Pakistan, with a copy to their office at 831-14th Street, Denver 2, Colorado, U. S. A.:

1. Name of Company or Firm
2. Country of Domicile
3. Full address, name and title of person to whom future correspondence should be directed
4. Record of experience on a similar work in the form of a "brochure", list of equipment fabricated and other data of a similar nature.

The above information should be sent airmail to reach the offices of the Authority's Consultants on or before 30 October 1961. The firms who have expressed an interest in the work by submitting the required information and satisfactory evidence of competency will subsequently receive the Contract Documents and Specifications and an invitation to submit a Tender for furnishing the butterfly valves and manual operating mechanisms for each link canal as the Contract Documents and Specifications are issued.

Project Director (Links)
WEST PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY

U. S. Government

Sealed bids for airconditioning phase II at the U. S. Post Office, Morgan Annex, 341 Ninth Avenue, New York, N. Y., will be received until 2:00 P.M. E.S.T. November 22, 1961 and then publicly opened. Bidding material may be obtained after 10-11-61 from the Design & Construction Division, 12th Floor West, Public Buildings Service, General Services Administration, 250 Hudson Street, New York 13, New York.

Read the Official

Proposal Columns of

ENGINEERING NEWS-RECORD

This Week and Every Week

OFFICIAL PROPOSALS

Bids: November 15, 1961

Indus Basin Project West Pakistan Water and Power Development Authority Advance Notice of Intent to Invite Tenders for the Construction of Canals and Appurtenant Works

The above Authority advertised in December 1960 regarding the construction of a number of large canals in West Pakistan. Their construction will be furnished through the Indus Basin Development Fund, the operation of which will be administered by the International Bank for Reconstruction and Development (World Bank).

The Authority plans to call for two separate construction tenders on the previously advertised Sidhnai-Mailsi-Bahawal Link Canal instead of a single tender as previously contemplated. One tender will be called for the Sidhnai-Mailsi portion of the canal and a second tender will be called for the Mailsi-Bahawal portion. All contractors who have made previous application and who have been prequalified to receive invitations to tender on the Sidhnai-Mailsi-Bahawal Link Canal will be sent invitations to tender on both the Sidhnai-Mailsi Link Canal and the Mailsi-Bahawal Link Canal. No further request or application from such prequalified contractors will be necessary.

In view of the above change it has been decided that additional contractors not already prequalified by the Authority will be permitted to submit information of their qualifications for undertaking the proposed construction of the Mailsi-Bahawal Link Canal in application for prequalification.

The Mailsi-Bahawal canal will have a length of 13 miles. It will require the excavation of about 4.1 million cubic yards of earth, compaction of 1.7 million cubic yards of embankment and the construction of eleven structures such as regulators, bridges and aqueducts. The capacity of the canal will be 3,900 cubic feet per second and it will be brick lined over most of its length.

The Authority plans to call for tenders for the construction of the Mailsi-Bahawal Link early in 1962. Only contractors who have been prequalified by the Authority will be invited to submit tenders for this purpose. Contractors who wish their names to be included on a list to receive the document for prequalification are requested to submit the following information on or before 15 November 1961 to the Authority's Consultants, Tipton and Kalmbach, Inc., at post office Box 589, Lahore, West Pakistan, with a copy to their office at 831-14th Street, Denver 2, Colorado, U.S.A.:

1. Name of Company or Firm with full address
2. Name and title of person to whom future correspondence should be directed.

The interested contractors will then be furnished with a document describing the work and setting forth the information required from them by the Authority in order to evaluate their qualifications for undertaking the proposed canal construction.

Project Director (Links)
WEST PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY

Bids: October 30, 1961

Indus Basin Project West Pakistan Water and Power Development Authority Advance Notice of Intent to Invite Tenders for the Procurement of Fixed-Wheel Gates

In connection with the construction of a number of large canals and appurtenant structures to be undertaken as a part of the Indus Basin Project in West Pakistan, the above Authority intends to call for tenders for the furnishing of fixed-wheel gates, frames, guides and hoists. The gates and appurtenant equipment will be installed in regulating structures to control and regulate flow of water in the canals. The procurement of the gates and appurtenant equipment will be financed through the Indus Basin Development Fund which will be administered by the International Bank for Reconstruction and Development (World Bank.)

The work will consist of furnishing all labor, services, materials, plant, equipment and supplies required to supply, f.o.b. manufacturer's plant, the required gates. The gates will be of the fixed-wheel type, 24 and 12 feet in width and with heights varying from approximately 10 to 18 feet. Gates higher than 12 feet will be fabricated in sections for field assembly at the site. Each gate is to be furnished complete with gate frame, guides, counterweight frame, and manually operated, cable-drum hoist. Approximately 29 gates will be required in the initial Tender covering gates for the Trimmu-Sidhnai Link Canal, and additional gates of a similar type will be procured for other link canals periodically in the future.

Invitations to submit Tenders, along with Specifications for the work, will be issued only to firms presenting satisfactory evidence of having successfully produced equipment of a similar nature. Those firms who wish their names to be included on a list to receive the Contract Documents and Specifications are requested to submit the following information to the Authority's Consultants, Tipton and Kalmbach, Inc., at Post Office Box 589, Lahore, West Pakistan, with a copy to their office at 831-14th Street, Denver 2, Colorado, U.S.A.

1. Name of Company or Firm
2. Country of Domicile
3. Full address, name and title of person to whom future correspondence should be directed
4. Record of experience on similar work in the form of a "brochure", list of equipment fabricated and other data of a similar nature.

The above information should be sent airmail to reach the offices of the Authority's Consultants on or before 30 October 1961. The firms who have expressed an interest in the work by submitting the required information and satisfactory evidence of competency will subsequently receive the Contract Documents and Specifications and an invitation to submit a Tender for furnishing the gates, frames, guides and hoists for each link canal as the Contract Documents and Specifications are issued.

Project Director (Links)
WEST PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY

Bids: November 1, 1961

Triborough Bridge and Tunnel Authority

SEALED BIDS WILL BE RECEIVED BY Triborough Bridge and Tunnel Authority at its office, Administration Building, Randall's Island, Manhattan, New York 35, New York, as follows:

Until 11 A.M. Wednesday, November 1, 1961

For Narrows Bridge Contract No. NB-11, Staten Island Approach and Plaza, Staten Island, New York City. The bid must be accompanied by a deposit in the amount of $250,000.00.

The contract includes grading, drainage, concrete and steel structures and paving.

Plans, specifications and contract documents may be purchased at the office of the Authority for $100.00 which will not be refunded.

OFFICIAL PROPOSAL

RATE: $2.70 per line (or fractional) per insertion.

CLOSING DATE: 10.30 a.m. Friday for issue out following Thursday.

SEND COPY: Official Proposal Division, Engineering News-Record, P. O. Box 12, New York 36, N. Y.

OFFICIAL PROPOSALS

Bids: October 31, 1961

New York City Housing Authority Advertisement for Bids Richmond Terrace Houses

Sealed proposals will be received by the New York City Housing Authority, 299 Broadway, New York 7, N. Y., until 2:30 P.M., October 31, 1961*, at which time said proposals will be opened and read in Room 312, for:

1. Foundations and General Construction
2. Heating and Ventilating
3. Electric Work
4. Plumbing
5. Elevators

For Richmond Terrace Houses (Project No. NY 5-39): Located in the area bounded generally by Richmond Terrace, Westervelt Avenue, Cleveland Street, Beechwood Avenue, Crescent Avenue, and Jersey Street, with the exclusion of certain portions thereof, but including an additional area west of Jersey Street, all as more fully shown and described on the drawings, in the Borough of Richmond, New York City. Consisting of six 8-story buildings containing 489 apartments. Of reinforced-concrete construction.

No prequalification is required for these contracts.

The Authority will welcome inquiries from contractors, which should be directed to the Construction Department, New York City Housing Authority, 299 Broadway, New York 7, N. Y. (DIgby 9-4310, extension 521).

NEW YORK CITY
HOUSING AUTHORITY
William Reid, Chairman

*The Authority reserves the right to postpone the bid date.

District of Columbia—Sewer Construction—Dept. of Sanitary Engineering, D. C., September 28, 1961. LOWER OXON RUN TRUNK SEWER, Blue Plains, Sewage Treatment Plant to Southern Ave. and Barnaby Rd., S.E. (Invitation No. C-6227-S), consist. of the following: OPEN CUT: 5,685 lin. ft. 48" dia., 15 lin. ft. 30" dia., 880 lin. ft. 27" dia., 235 lin. ft. 24" dia. and 1,215 lin. ft. 21" dia. reinf. concrete pipe sewer; 300 lin. ft. 15" dia. vitrified clay pipe sewer; and 7 reinforced concrete structures. TUNNEL: 15 lin. ft. 48" dia. and 56 lin. ft. 24" dia. reinforced concrete pipe sewer. (Wage rates have been predetermined by Labor Dept.) Bid forms, plans and specifications are now available from Supervisor, Bid and Contract Division, Procurement Office, D. C., Room 404, 499 Penn. Ave., N.W., upon deposit of a certified check for $50.00 per set, payable to D. C. Treasurer (Phone NA 8-6000, Ext. 448). SEALED BIDS to be opened 3:00 PM, EDT, October 13, 1961, in Room 424, 499 Penn. Ave., N.W.

Bids: November 1, 1961

Board of Education Bureau of Construction

Notice Re: Prequalification Forms for Contractors
APPROVED AS TO FORM
Acting Corp. Counsel

NOTICE IS HEREBY GIVEN THAT The Deputy Superintendent of Schools, Office of School Buildings, Bureau of Construction, 4th Floor, Room 407, 42-15 Crescent Street, Long Island City 1, New York will receive applications for prequalifications from contractors who may wish to submit bids for the proposed hereinafter specified contracts. For the general construction, plumbing and drainage, heating and ventilating, and electrical work and lighting fixtures of: Public School 21 (New Building), 147th Street to 149th Street, 26th and 27th Avenues, Borough of Queens, Public School 197 (New Building) Beach 8th Street to Beach 9th Streets, Lanett Avenue and Hicksville Road, Far Rockaway, Borough of Queens, and Public School 25 (New Building) Henderson, Campbell Avenue and Broadway, West Brighton, Borough of Richmond.

The prequalification application form must be secured at the Office of School Buildings, Bureau of Construction, Room 407, 42-15 Crescent Street, Long Island City 1, New York and submitted to the Deputy Superintendent of Schools at the same above address.

Bids when advertised, will be received only from prequalified bidders.

The time for submitting prequalification applications by contractors will expire on *Wednesday, November 1, 1961.*

Bernard E. Donovan
Deputy Superintendent of Schools
Starting: Thurs., Sept. 28th, 1961
Five (5) days.

Dated: September 25, 1961
JJF:dem

OFFICIAL PROPOSALS

District of Columbia—Sewer Construction—Dept. of Sanitary Eng., D. C., Office of the Potomac Interceptor, Sept. 21, 1961. UNIT 5, the HORSEPEN TUNNEL of the POTOMAC INTERCEPTOR SEWER, located at Dulles International Airport, Va. (Invitation No. C-6231-S), Contract No. 18961, consisting of the following: OPEN CUT AND/OR TUNNEL CONSTRUCTION: 350 lin. ft. 42" i.d. reinforced concrete pipe and 2,000 lin. ft. of sewer with a minimum internal diameter of 36". (Wage rates have been predetermined by Labor Dept.) Bid forms, plans and specifications are now available from Supervisor, Bid & Contract Div., Procurement Office, D. C., Rm. 404, 499 Pa. Ave., N.W., upon deposit of a certified check for $50.00 per set, payable to D. C. Treasurer (Phone NA 8-6000, Ext. 448). SEALED BIDS to be opened 3:00 PM, EDT, Oct. 18, 1961, in Rm. 424, 499 Pa. Ave., N.W.

U. S. Government

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-5670) will be received at Lewiston, California, until 2 p.m., Pacific Standard Time, November 2, 1961, for furnishing labor and materials for Keswick-Gaspoint Road-Cottonwood 230-Kilovolt Transmission Line, Trinity River Division, California, Central Valley Project. Location Shasta County, California. Principal items are 12,780 cu. yds. excavation; 2,830 cu. yds. concrete; 3,130,000 pounds furnishing tower bodies and leg extensions; 22.70 miles of line stringing 1,272,000 circular-mil, 45/7, ACSR; and other work. Completion time 400 days. For particulars, address Bureau of Reclamation, P. O. Box 2511, Sacramento 11, California; P. O. Box 247, Lewiston, California; or Building 53, Denver Federal Center, Denver 25, Colorado. Floyd E. Dominy, Commissioner.

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-5671) will be received at Gunnison, Colorado, until 10 a.m. Mountain Standard Time, October 31, 1961, for furnishing labor and materials for Blue Mesa-Curecanti, Morrow Point-Curecanti, and Curecanti-Montrose 115-Kilovolt Transmission Lines, Transmission Division, Colorado, Colorado River Storage Project. Location Gunnison and Montrose Counties, Colorado. Principal items are 353 structures, furnishing and constructing various types of structures with 35 to 85 foot maximum pole lengths; 27.19 miles of line, furnishing and stringing three 556,500-circular-mil ACSR; 11.98 miles of line, furnishing and stringing three 477,000-circular-mil ACSR; and other work. Completion time 570 days. For particulars, address Bureau of Reclamation, P. O. Box 360, Salt Lake City 10, Utah; P. O. Box 179, Gunnison, Colorado; or Building 53, Denver Federal Center, Denver 25, Colorado. Floyd E. Dominy, Commissioner.

Sealed bids for airconditioning Phase II at the F.O.B. (Vesey St.) 90 Church St., New York, N. Y. Project No. 00959, will be received until 2:00 P.M. E.S.T. November 3, 1961 and then publicly opened. Bidding material may be obtained after 10-6-61 from the Design and Construction Division, 12th Floor West, Public Buildings Service General Services Administration, 250 Hudson Street, New York 13, N. Y.

At Your Service...

The Searchlight Section is at your service for bringing business needs or "opportunities" to the attention of men associated in executive, management, sales and responsible technical, engineering and operating capacities with the industry served by McGraw-Hill publications.

OFFICIAL PROPOSALS

Bids: October 31, 1961

Power Authority of the State of New York

ADVERTISEMENT FOR PROPOSALS
FOR
CONSTRUCTION OF OBSERVATION BUILDING AND RELATED FACILITIES FOR THE ROBERT MOSES NIAGARA POWER PLANT IN LEWISTON, NIAGARA COUNTY, NEW YORK

SPECIFICATIONS NO. PA-N-23043
NIAGARA CONTRACT NO. N 34

NOTICE TO CONTRACTORS: The POWER AUTHORITY OF THE STATE OF NEW YORK will receive sealed proposals for construction of the Observation Building and related facilities for the Robert Moses Niagara Power Plant, in Lewiston, Niagara County, New York, until 10:30 A. M. Eastern Standard Time on the 31st day of October, 1961, at the Authority's Office, 18th Floor, The Coliseum Tower, 10 Columbus Circle, New York 19, New York, at which time and place the proposals will be publicly opened and read aloud.

The work under this contract consists of the construction of the upper portion of the South Buttress of the Power Plant from approximately El. 543' to El. 576'-1"; mechanical, electrical and partial architectural work below approximately El. 543' in the South Buttress; a two story Observation (Overlook) Building approximately 120' x 120' in plan located atop the South Buttress of the Robert Moses Niagara Power Plant; a one story Reception Building approximately 89' square including a basement, foundations, and a stair tower; a connecting enclosed overpass approximately 13' wide by 8' high by 238' long connecting these two buildings; a section of Lewiston Road and South Approach Road; and other appurtenances in and around the South Buttress and Service Tunnel.

All work shall be completed on or before May 15, 1963.

Plans, specifications and proposal forms for the work may be obtained from the Power Authority of the State of New York, 18th Floor, The Coliseum Tower, 10 Columbus Circle, New York 19, New York, upon application and prepayment of a fee of Twenty Dollars ($20.00) per initial set of contract documents, and Fifteen Dollars ($15.00) per set for additional sets, no part of which will be refunded. Plans, specifications and proposal forms for the work will be on file in the Authority's Office and in the offices of the Engineer, Uhl, Hall & Rich, 230 Congress Street, Boston 10, Massachusetts, and may be inspected by prospective bidders during office hours.

Bids must be made and returned in duplicate in accordance with instructions contained in the Information for Bidders. Guarantee will be required with each bid in an amount not less than 20 percent of the total of the gross sum bid.

The right is reserved to reject any or all bids.

W. S. CHAPIN
GENERAL MANAGER

PA-N-23043

District of Columbia—Sew. Treatment Plant—Dept. of Sanitary Engineering, D.C., September 26, 1961. MAIN SEWAGE PUMP NO. 5, SEWAGE TREATMENT PLANT, UNIT NO. 3C (Invitation No. C-6247-S), consist. of furnishing an electric-motor-driven centrifugal or mixed flow sewage pumping unit and appurtenances with switchgear and electric control accessories and installing the same upon foundations to be erected under this contract, and furnishing and installing pipe, valves and auxiliary equipment in the sewage pumping station and piping to the grit chamber of the D.C. Sewage Treatment Plant at Blue Plains in D.C. (Wage rates have been predetermined by Labor Dept.) Bid forms, plans and specifications are now available from Supervisor, Bid & Contract Division, Procurement Office, D.C., Room 404, 499 Penn. Ave., N.W., upon deposit of a certified check for $50.00 per set, payable to D.C. Treasurer (Phone NA 8-6000, Ext. 448). SEALED BIDS to be opened 3:00 PM, EDT, October 20, 1961, in Room 424, 499 Penn. Ave., N.W.

Contractors Watch This Section—

for new projects. Publish your announcements through the proposal sections of *Engineering News-Record* and get their bids.

OFFICIAL PROPOSALS

Bids: November 2, 1961

Advertisement
The Port of New York Authority
New York International Airport
Southerly Extension of
Runway 4L-22R
Hydraulic Fill
Contract NYA-490.003

Sealed proposals for the sale of materials and performance of Work for the placing of hydraulic fill for the southerly extension of Runway 4L-22R at New York International Airport will be received at the office of the Chief Engineer of the Port of New York Authority, Room 1100, 111 Eighth Avenue, New York 11, N. Y., until 2:30 P.M. on Thursday, November 2, 1961, at which time said proposals will be opened and read in Room No. 1108.

Contract documents may be seen at the Office of the Assistant Chief Engineer for Design of the Authority, Room 1115. Documents will be furnished upon deposit of $30.00 per set for not more than three sets to any one company (each set including one copy of the contract drawings). Additional sets will be furnished upon payment of $30.00 per set, which payment is not returnable. Deposits and payments shall be delivered to the Treasury Department, Room 1001, where a receipt will be issued. The receipt shall be delivered to Room 1115, where the documents will be furnished.

Those who have submitted a bid on the contract directly to the Authority will receive a refund of the deposits for each set of documents, not exceeding three, returned within forty days after the opening of proposals. Those who have not submitted a bid will receive a refund of one-half of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
S. Sloan Colt, Chairman
New York, October 5, 1961

Bids: November 15, 1961

The Republic of Indonesia
Department of Harbors
Djakarta, Indonesia

The Government of Indonesia, through the Department of Harbors, solicits tenders for the construction of a reinforced concrete wharf on precast concrete piling plus transit shed and other facilities at Pontianak, Kalimantan. The pier structure will be 42 meters wide, 120 meters long, supported by 800 piles. The transit shed will be of structural steel.

Sealed bids will be received on 15 November 1961 at the Department of Harbors, Medan Merdeka, Timur 5, Djakarta, Indonesia. Plans and specifications may be viewed at the Harbor Department offices, at the office of the Consultant, Daniel, Mann, Johnson, & Mendenhall, 3325 Wilshire Boulevard, Los Angeles 5, California, and also at the following Indonesian Embassies and Consulates:

Washington, D. C.
San Francisco, California
Singapore, Malaya
Manila, Philippines
Hong Kong, B. C. C.
Tokyo, Japan
Bonn, Germany
Canberra, Australia
Paris, France

Interested parties may secure bidding documents from the Consulting Engineers upon making a deposit of $250.00, U. S. currency, 80% refundable to bona fide bidders.

Northern Pacific Railway Company, Sealed bids will be received at St. Paul, Minnesota until noon November 6, 1961, for furnishing labor and materials for raising a double track railroad bridge, constructing two new piers, removing 2 spans of deck plate girders, and erecting a new 192 ft. truss span. Bridge is over the Mississippi River in Minneapolis, Minnesota. Principal items are 31,000 lin. ft. timber piling, 2300 cu. yds. concrete and 1,345,000 lbs. structural steel. For particulars, address: M. O. Woxland, Bridge Engineer, Northern Pacific Railway, St. Paul 1, Minnesota.

(Additional Proposal Advertisement on Page 92)

EMPLOYMENT OPPORTUNITIES

DISPLAYED RATE:

The advertising rate is $45.20 per inch for all advertising appearing on other than a contract basis. Frequency rates quoted on request.

An advertising inch is measured 7/8" vertically on a column—3 columns—30 inches to a page.

Subject to Agency Commission.

OCTOBER 19TH ISSUE CLOSES OCTOBER 9TH

UNDISPLAYED RATE:

$2.70 per line, minimum 3 lines. To figure advance payment count 5 average words as a line.

Position Wanted ads take ½ of above rate.

Box numbers—count as 1 line.

Discount of 10% if full payment is made in advance for 4 consecutive insertions.

Not subject to Agency Commission.

ADDRESS BOX NO. REPLIES TO: Box No. Classified Adv. Div. of this publication. Send to office nearest you.
NEW YORK 36: P. O. Box 12
CHICAGO 11: 645 N. Michigan Ave.
SAN FRANCISCO 11: 255 California St.

• POSITIONS VACANT

Structural Engineer-Midwest consulting firm seeks Ph.D. to design complex steel structures, reinforced and prestressed concrete. **Preference will be given to applicants with practical experience. Permanent position with** established firm in business since 1929. **Moving expenses paid. Send resume, including education, experience, and personal qualifications to P-6245. Engineering** News-Record.

Sanitary Engineer. Opportunity to assume overall supervision and client contact on sanitary projects for long-established midwestern consulting engineering firm. Experience in all phases of sanitary work is desired. Send complete resume of experience and qualifications. Replies held in strictest confidence. Our employees know of this advertisement. P-7178, Engineering News-Record.

Water Plant Superintendent—Water Distribution Superintendent—Mid-Western University City of 40,000 population is accepting applications of the above positions. The City has recently assumed operation of the Water Utilities and the position offers a real challenge for competent and experienced men. Salary open, liberal vacation, sick leave, etc. Apply P-7440, Engineering News-Record.

Positions open for experienced highway designers, draftsmen and tracers. Address application to Yule, Sticklen, Jordan & McNee, P.O. Box 337, Camp Hill, Pa.

Engineering Sales Correspondent—The Fabricated Products Division of a major steel corporation is looking for a young engineering graduate to fill the position of sales correspondent in its Philadelphia branch office. This position will lead to a sales engineer field assignment in one of the Mid-Atlantic States. Attractive base salary, bonus plan and fringe benefits. P-7438, Engineering News-Record.

Permanent openings for Resident Engineers experienced in supervision of construction of large steam power plants and/or high-voltage transmission lines. Degree and registration desirable. Excellent opportunity with consulting engineering firm. Please send resume of education and experience to P-7228, Engineering News-Record.

Openings for recent Civil Engineer graduates with military obligations completed who desire to learn the construction business. Must be ambitious, aggressive, dependable, use no intoxicants, willing to start in the field on industrial buildings, defense construction, heavy construction, and willing to move. Preferably single. We operate throughout Kansas and adjacent states; offer excellent opportunity for advancement. Martin K. Eby Construction Co., Inc., P. O. Box 1679, Wichita, Kansas.

Graduate Engineer with at least 1 year experience in electronic computer programming and/or application for Computer Section of large consulting engineering firm presently using Bendix G-15 Computer. Permanent employment with liberal benefit program. Reply with resume to Stanley Engineering Company, Muscatine, Iowa.

Estimator, Construction: Must be thoroughly experienced in quantity survey work for commercial and government buildings. Pricing knowledge not required. Good opportunity with progressive expanding organization. Forward qualifications and references to: Blake Construction Co., Inc., 1120 Connecticut Avenue, N. W., Washington, D. C.

Registered structural engineer for national structural steel fabricating firm located in Southern California. Permanent position with good possibility of advancement. Send resume, salary expected, references and availability to P-7511, Engineering News-Record.

• POSITIONS VACANT

Graduate Civil Engineer to learn prestressed concrete fabrication. Should have approximately two years of working experience in some engineering field, be married, willing to relocate in Greensburg, Pennsylvania, area. Opportunity involves layout and design of shop drawings, check on daily production line layout, testing of materials and quality control, surveying in connection with plant work and some jobsite work, estimating and quantity takeoff, field sketches. Good possibility to grow with the company. Reply to P-7534, Engineering News-Record, with resume of education and experience.

Structural Engineer. Structural design in Architect's office, involving schools, hospitals, commercial work. Located Kansas City. Permanent position, opportunity for advancement. Starting salary $8,000. Give age, education and experience. P-7553, Engineering News-Record.

Production Superintendent—Unusual opportunity with solid, fast growing company located in the Delaware Valley area of southeastern Pennsylvania, for a man with steel shop fabrication experience. Must be familiar with all phases of stamping, punching & welding operations. Must also have a background in shop methods, plant layout & some industrial engineering. Minimum 7 years supervisory experience required. Age no barrier. If you want to capitalize on your abilities send full resume & salary desired. P-7587, Engineering News-Record.

Carpenter Superintendent for Dam Construction (150,000 CY). Must be young and aggressive. S.O.G. of Texas, P. O. Box 3026, Waco, Texas.

General Building Superintendent, C.E. preferred. Openings in Mid-West and South. Must be experienced in High Rise Public Works structures. Good opportunity to join expanding company. Send resume, age, education, experience, references. Salary open. P-7530, Engineering News-Record.

Engineer — Latin-America Sales — Long-established manufacturer of heavy machinery, whose Latin American Sales average several million dollars a year, will employ one or two men in the capacity of Sales Engineers for Latin America. Applicants should be recent engineering graduates in Mechanical, Marine, Civil or Electrical Engineering, or have some sales or other experience with heavy machinery. Must have excellent knowledge of English and preferably, some facility with Spanish. Permanent positions with broad opportunity for advancement for men who qualify. Positions require permanent residence in Baltimore with very extensive travel in Latin America. Send complete resume including education, experience, family status, citizenship and salary range to P-7585, Engineering News-Record.

Graduate engineer, minimum three years experience in general contracting estimating, and administration, opportunity for ambitious man with growing Eastern construction company, submit complete resume, references, availability and salary to P-7588, Engineering News-Record.

Estimator for General Contractor in heavy commercial, industrial and paving projects. Must be top notch man in take-off, change orders, etc. Excellent opportunity with one of country's leading contractors. Chicago area. Give resume. P-7574, Engineering News-Record.

Civil Engineer, min. 5 yrs irrigation and/or hydroelectric experience. Overseas assignment with expanding consulting firm. Send resume and salary desired. P-7577, Engineering News-Record.

Highway Designers—Large Midwest consulting engineering firm has permanent employment for qualified engineers with minimum of three years experience in highway design. Salary commensurate with ability and experience. Real opportunity with this expanding firm. Send complete resume to P-7580, Engineering News-Record.

(Continued on page 89)

OPENING FOR MAN WITH EXECUTIVE AMBITION IN BUILDING CONSTRUCTION

Man, not over 45, wanted as chief estimator; must be mature and neat appearing since much of our work is done on a negotiated basis involving personal contact with clients.

Must be capable of making complete quantity take-off and of pricing labor under union field conditions; must be familiar with demolition, earth work, concrete construction, masonry, and carpentry (rough and finished) for alteration and new construction in commercial, industrial, and institutional field. Present volume in low millions.

Northern New England location; salary and profit sharing arrangement; ownership in corporation invited. For personal interview, please write to:

P-7527 Engineering News Record
Class. Adv. Div., P.O. Box 12, N. Y. 36, N. Y.

CIVIL ENGINEERS

Graduate Civil Engineer with at least 10 years progressive experience in design of powerhouses, tunnels, and intake structures for Section Head position. Working knowledge of fill dams and hydraulics with capability for following design studies in other departments required. Must have initiative to carry out studies to completion. Experience in client contact also necessary.

Graduate Civil Engineer as cost estimator for large hydro project with good experience in writing and reviewing specifications. Must have at least 5 years experience.

Fringe benefits and partial relocation costs. Send complete resume to Personnel Manager.

HARZA ENGINEERING COMPANY
400 West Madison Street, Chicago 6, Illinois

Pennsylvania's Long-Range Highways Expansion Program Offers Permanent Positions and Challenging Opportunities to

HIGHWAY DESIGNERS and MATERIALS ENGINEERS

Starting Salaries from $5,000 to $11,000.

• Growth Potential • Civil Service Security • Fringe Benefits

For Civil Service examination application write prior to October 27th to:

RECRUITMENT SECTION, ROOM #418, NORTH OFFICE BLDG.
PENNSYLVANIA DEPARTMENT OF HIGHWAYS, HARRISBURG, PA.

GENERAL CONSTRUCTION SUPERINTENDENT

Salary Open

This is an exceptional opportunity—with definite management potential—to join a nationally known engineer contractor corporation located in New York.

The man we seek should have a record of accomplishment as general superintendent on lump sum projects. Additional experience must include estimating, proposal preparation and sub-contract negotiations.

Reply in full confidence to:

P-7602, Engineering News-Record
Class. Adv. Div., P.O. Box 12, N. Y. 36, N. Y.

GRADUATE CIVIL or ARCHITECTURAL ENGINEERS and SENIOR CARPENTER FOREMEN

We are looking for young, recent college graduates, with a degree in either architectural or civil engineering, for a position in our El Paso, Texas Estimating Department. This position provides a training ground for our future superintendents and executives. It is an excellent opportunity for a young man to obtain a desirable position with a reliable firm doing all types of construction work.

Experienced senior carpenter foremen required for work in Southwest area.

ROBERT E. McKEE
General Contractor, Inc.
P. O. Box 562 El Paso, Texas

STRUCTURAL ENGINEER

Graduation from a four year college or university with major course work in structural engineering plus 3 years experience. Salary range $7579-$9100 per annum.

CIVIL ENGINEER I

Graduation from a four year college or university with major course in civil engineering or architecture. Salary Range $5356-$6461 per annum.

Complete details by writing to Director of Personnel, Municipal Building, Hartford, Conn.

SOILS ENGINEER

Civil engineers trained or experienced in soils mechanics and geologists will receive preference for this permanent position with Midwest technical laboratory engaged in consulting work. Moving expenses paid. Some travel. Send complete resume to

P-7499, Engineering News-Record
645 N. Michigan Ave., Chicago 11, Ill.

Highway and Bridge Engineers

Permanent positions available for graduate Civil Engineers with a minimum of five year's experience in Highway, Drainage, or Bridge Design.
Company benefits include hospitalization, insurance, sick leave and vacation.
Send complete resume, references and salary requirements to

RACKOFF ASSOCIATES
867 South James Road Columbus 13, Ohio

STRUCTURAL ENGINEERS

We now have immediate openings for graduate engineers with a minimum of three years design experience in heavy industrial construction, preferably in the ore handling and processing field. Salary is based on qualifications and experience. Send a complete resume, including education, experience, and references to: PERSONNEL—

WESTERN KNAPP ENGINEERING CO.
650 Fifth Street, San Francisco, California

"Put Yourself in the Other Fellow's Place"

TO EMPLOYERS
TO EMPLOYEES

Letters written offering Employment or applying for same are written with the hope of satisfying a current need. An answer, regardless of whether it is favorable or not, is usually expected.

MR. EMPLOYER, won't you remove the mystery about the status of an employee's application by acknowledging all applicants and not just the promising candidates.

MR. EMPLOYEE you, too, can help by acknowledging applications and job offers. This would encourage more companies to answer position wanted ads in this section.

We make this suggestion in a spirit of helpful cooperation between employers and employees.

This section will be the more useful to all as a result of this consideration.

Classified Advertising Division

McGRAW-HILL PUBLISHING CO., INC.
330 West 42nd St., New York 36, N. Y.

SALES ENGINEERS PROCESS ENGINEERS

Opportunities for both Sales and Process Engineers with medium size engineering-construction company which designs and builds equipment and entire plants for the chemical process industry. Must have chemical engineering degree and not less than five years experience in design and/or operation of chemical process plants. Special knowledge desirable in distillation and high pressure technology. Process Engineer applicants should have healthy curiosity about processes, ability to calculate material and heat balances, knowledge of practical predesign, and ability to prepare estimates.

Send detailed resume outlining education, experience and salary requirements to:

Manager of Personnel

VULCAN-CINCINNATI, INC.
120 Sycamore Street
Cincinnati 2, Ohio

FEDERAL GOVERNMENT OF NIGERIA FEDERAL MINISTRY OF EDUCATION

SENIOR LECTURER (ENGINEERING)

To teach Electrical Engineering up to Higher National Certificate standard, and to organize the Electrical Engineering Section of the Engineering Department.

Qualifications: A good degree in Engineering (Electrical) and Corporate Membership of the Institution of Electrical Engineers. Teaching experience in Technical College and industrial experience will be an advantage. Applicants should be between 25 and 50 years of age.

Appointment on contract. Salary (including Inducement Addition) fixed at £2,376 p.a. plus gratuity of £150 p.a. Free passages; children's allowance; liberal home leave on full pay; quarters and income tax at low local rates.

Write for application forms and further particulars, stating briefly age, qualifications and experience, to the Recruitment Attache, Nigeria High Commission, 9 Northumberland Avenue, London, W.C.2., quoting Ref: C.3266./6.

• POSITIONS VACANT

(Continued from page 87)

Estimator—Approximately 10 years of estimating experience in commercial and industrial building construction required. Excellent opportunity for a permanent position with an established medium-sized contractor in North-Central Connecticut. Please state availability, education and salary required. P-7582, Engineering News-Record.

Sewer Estimator—Engineer—C.E. graduate with desire to become part of aggressive and growing construction firm specializing in sewers. Location: Iowa. Prefer Registered P.E. Send complete resume of education, experience and qualifications including salary expected to Stanfield-Pyland Construction Co., 5731 Urbandale Avenue, Des Moines 10, Iowa.

Assistant Hydraulic Engineer: New York State Conservation Department. Salary $7360 to $8910. Civil Service examination to be held December 2, 1961. Requires one year in hydraulic engineering or in the supervision or operation of a public water supply system, and five additional years of pertinent training and/or experience. New York State residence is not required. For details and application form, write to Recruitment Unit, Box 36A, New York State Dept. of Civil Service, The State Campus, Albany 1, N. Y.

Wanted—Civil Engineer—Capable of designing storm sewers, paving, planning, inspection and miscellaneous other county work. Minimum 5 years experience in county highway or municipal work. College graduate or equivalent. Send resume and state salary required. Apply—Personnel Assistant, Anne Arundel County Commissioners Courthouse, Annapolis, Maryland.

Civil Engineer, minimum three years experience in municipal engineering and general civil engineering. For a position with municipal public agency. Desire some structural background. Salary to $8,300. Location Southern New England. Submit resume to P-7600, Engineering News-Record.

EMPLOYMENT SERVICES

"NER" describes hundreds of $7,000-$35,000 Executive job openings monthly. Write for free copy. National Employment Reports, 105 W. Adams, 830-B, Chicago 3.

• POSITIONS WANTED

Construction Engineer Executive, age 44, excellent health, BSCE, registered engineer several states. Liquidating own eastern company. Operated 7 years, industrial-commercial projects, large national accounts; mostly negotiated contracts. Know all phases, top negotiator, and contract closer, can open any door. Salary not major consideration. PW-7336, Engineering News-Record.

Project Manager, Contracts Administrator, Age 42, 20 years experience in engineering and contracts administration. Strong mechanical background, good knowledge civil. Mining, ore processing, steam power plants, papermills, refineries, petro-chemical plants, airbases, missile installations, heavy and general construction. Thoroughly competent in all phases of contracts administration and engineering office management. Previous foreign experience. Very good Spanish. Excellent references. Presently with engineering and consulting firm. Desire responsible administrative or managerial position. Prefer Europe or Latin America but will consider other locations. PW-7505, Engineering News-Record.

Construction Executive—30 years experience in all phases of heavy and industrial construction, power plants, chemical plants, sewage plants, filtration plants, refinery installations, locks, dams and tunnels. Interested in connection with aggressive contractor doing lump sum contracts and/or promotional sales work. Estimating and pricing accurate. Primary education M.E. Desirous of participating agreement. PW-7492, Engineering News-Record.

Structural Engineer and/or Plant Manager, P.E. prestressed & precast concrete experience. Desire position with growth potential. PW-7471, Engineering News-Record.

Project Manager, entire supervision & admin. estimating and methods, 24 yrs. exp. hvy-const. major projects U.S.&O.S. PW-7337, Engineering News-Record.

Construction Accountant. 15 years experience in every phase of Office Procedure. Presently employed as Secretary Treasurer of small construction firm. Available on reasonable notice. Age 36. PW-7555, Engineering News-Record.

• POSITIONS WANTED

Manager — Precast, prestressed concrete manufacturer. Experienced in production, sales, plant design, engineering, cost accounting. Construction background. PW-7557, Engineering News-Record.

Superintendent—30 years experience, desires steady employment. Thorough knowledge of heavy excavation projects. Also iron ore stripping and mining, coal mining and large solid rock excavations. Supervision and Maintenance of all types heavy construction equipment, project estimating; will accept position as Equipment Superintendent; finishing project soon, will accept position and go anywhere. PW-7533, Engineering News-Record.

Chief Engineer available soon. Graduate and Registered with 14 years contractors experience in estimating and management of commercial, highway, and heavy construction. Resume sent upon request. PW-7581, Engineering News-Record.

Senior Civil Structural Engineer. Regist. in 8 states. Broad experience large bridges; industrial plants, commercial, instit. bldgs, etc. Handles multimill, dollar jobs from A to Z. Desires responsible position. PW-7513, Engineering News-Record.

Structural Engineer — Estimator — Spec. Writer. Thorough excellent design, estimating, contact & negotiating exper. Top eng. & const. firms. Large industrials, chemicals, power plants, bridges, airfields, waterfronts, etc. PW-7552, Engineering News-Record.

C.E. 25 yrs. exp: layout, field engr., supervision on steam generating, lock, conc. structures and earthwork. Seeks job as field or layout engr. or inspection. 57, $150. PW-7541, Engineering News-Record.

Quarry, Crushing Plant, or Tunnel Foreman. Available now—past 9 years with same American construction co. in Latin America. Speak Spanish and Portuguese freely. Capable taking full charge, either operation. PW-7540, Engineering News-Record.

Construction Manager—General Superintendent—Aggressive administrator. Record of profit-making jobs with thorough background in all phases of construction. Write PW-7578, Engineering News-Record.

• POSITIONS WANTED

Construction Supt. Heavy Construction. PW-4482, Engineering News-Record.

College Grad. B.S. in Business—Desires office or field position. Construction experience with excavating contractor. 1 year accounting. Will relocate anywhere. Top references. PW-7579, Engineering News-Record.

Layout Eng. or party chief-clerk of works, will travel. Location immaterial—single. PO Box 949, Hollywood, Fla.

Estimator 18 years experience heavy, building and mechanical construction, government contracts. Capable of full responsibility from bidding to completion, buying, subcontracts, change orders, cost control, field supervision. Able to negotiate with clients and architect. PW-7570, Engineering News-Record.

Estimator and Construction Engineer, BSCE. 22 years experience in all phases of construction including 4 years mechanical. PW-7596, Engineering News-Record.

Construction Engineer, BSCE, CE, Reg. (Pa., Ala.), 55, long experience in Heavy Construction. Seeks permanent position with engineering firm in southeastern U. S. PW-7589, Engineering News-Record.

Hydro-Heavy Constr.—Age 35, 3 years industr. bldgs., 4 years all round exp. concrete dam and powerhouse constr. B.S.C.E. Locate anywhere with progressive company. PW-7591, Engineering News-Record.

Consulting engineer, age 32, located in Boston, Mass. with broad experience in all phases of building service engineering operation including business management, client-contractor relations, personnel supervision, field supervision, direction of design projects of commercial and institutional buildings. Qualified to assist principal in all phases of professional service. Desires a responsible growth position. PW-7584, Engineering News-Record.

Soils & Materials Engineer—31—family. 10 years soils, asphalt and concrete engineering; overseas and domestic. Experience dams, roads, airfields, foundations. Field and lab. testing and control. Foundation and material testing, exploration. Resume upon request. PW-7494, Engineering News-Record.

SEARCHLIGHT SECTION

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The advertising rate is $25.50 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

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EQUIPMENT WANTED or FOR SALE ADVERTISEMENTS acceptable only in Displayed Style.

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$2.70 a line, min. 3 lines. To figure advance payment count 5 average words as a line.

BOX NUMBERS count as one additional line in undisplayed ads.

DISCOUNT OF 10% if full payment is made in advance for four consecutive insertions of undisplayed ads.

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Exclusive Training Course by mail for top positions. Publishers Manual of Advanced Construction Management. Send postcard for details.

National Schools of Construction
Est. 1952
Satsuma, Florida

STRUCTURAL ENGINEERING
ARCHITECTURAL ENGINEERING
OUR COURSES of instruction by mail HAVE HELPED THOUSANDS to better positions and to pass State Board Examinations. Forty-eighth year.
WILSON *Engineering Corp.*
College House Offices HARVARD SQ., CAMBRIDGE, MASS.

New Searchlight Advertisements
received by October 9th will appear in the October 19th issue. Subject to limitation of space available.
Address copy to the Classified Advertising Division
ENGINEERING NEWS-RECORD
P. O. Box 12, New York 36, N. Y.

DIVING SERVICE
WORLD WIDE
- SALVAGE
- CONSTRUCTION
- INSPECTION
- BURNING & WELDING
- DEMOLITION
- UNDERWATER T.V. & PHOTOGRAPHY

MAXIMUM INSURANCE COVERAGE

SANFORD BROS., INC.
211 Onstead St. Morgan City, La.
Phone 459-5832

BUY SELL RENT
IN STOCK—DISMANTLED
TEMPORARY BRIDGE BEAMS
HEAVY—LONG OR SHORT SPANS
LEOPOLD COHEN IRON CO.
3000 S. KEDZIE CHICAGO 23, ILL. BI 7-6336

HEAVY EXCAVATION EQUIPMENT
DRAGLINES, SHOVELS, CRANES, DRILLS, TRUCKS

1150-B B.E. Drag, Excellent Condition
9-W B.E. Elec. Drag, 200', 8 yd. or 160', 10 yd.
9-W B.E. Diesel Drag, 165', 12 yd.
7-W B.E. Diesel Drag, 140', 7 yd.
7400 Marion Diesel Drag, 175', 13 yd.
7400 Marion Elec. Drag, 175', 12 yd.
625 Page Diesel Drag, 150', 9, 10 & 10½ yd. Buckets
631 Page Elec. Drag, 200', 8 yd.
621-S Page Diesel Drag, 125', 7 yd.
183-M Marion Diesel Drag, 130', 8 yd.
200-W B.E. Diesel Drag, 125', 6 yd.
2400 Lima Diesel & Elec. Drags, 130', 6 yd.
7200 Marion Diesel Drag, 135', 5 yd.
4500 Manitowoc Drag, 120', 5 yd. & 140', 4 yd.
120-B B.E. Elec. Drag, 115', 5 yd.
71-B B.E. Crane with 160' boom
3900, 3500 & 3000 Manitowoc Cranes
111-M Marion Drag, 100', 4 yd.
1055 P&H Diesel Drag, 80', 4 yd.
1601 Lima 4 yd. Shovel/Drag
1201 Lima Drag, 85', 3 yd.
54-B B.E. Drag, 80', 2½ yd.
5560 Marion 26 yd. Elec. Shovel
5323 Marion 18 yd. Elec. Shovel
190-B B.E. 8 yd. Elec. Shovel
170-B B.E. 6 yd. Elec. Shovels
151-M Marion 7 yd. Elec. Shovel
1600 P&H 6 yd. Elec. Shovels
4161 Marion 6 yd. Elec. Shovel
2400 Lima 6 yd. Std. & H.L. Shovels
120-B B.E. & 4121 Marion 4 yd. Elec. Shovels
111-M Marion Std. & H.L. Shovels
1201 Lima & 54-B B.E. Standard Shovels
#6 Northwest & 80-D N.W. Standard Shovels
Model T-650 REICHdrill Truck Mtd. Rotary & Down-The-Hole
Ingersoll-Rand Truck & Crawler Mtd. Drill-masters
Euclid Trucks, Rr. & Bottom Dump; Dozers, etc.

FRANK SWABB EQUIPMENT CO., INC.
Hazleton National Bank Bldg.
Hazleton, Pa. — GLadstone 5-3658

FOR SALE

2 MANITOWOC 4500 shovels S/N 4630 & 4637 equipped with 50' booms, & 37' sticks & 5 cu. yd. buckets.
2 LORAIN L85 shovels S/N 0001 & 0002 equipped with 26' booms & 24' sticks
2 KOEHRING 304 shovels with 1 cu. yd. buckets S/N C7503 & C7504
1 BUCYRUS ERIE 38-B shovel S/N 93773
2 ROBBINS vertical rotary drills equipped to drill 9" plus holes. Mounted on Int. TD-24 tractors with Gardner Denver air compressors.
2 CATERPILLAR D-8 bulldozers 14A1940 & 1988
2 EUCLID TC-12 tractors equipped as pushers, one may be equipped as bulldozer S/N 19274 & 23268
1 HUBER-WARCO grader 5-D-190 S/N 5D-197247
1 JOY 5CM miner
1 JEFFREY 76 AM Colmol
1 90 ton portable coal bin.
1 1,000 ft. of 30" extensible belt with drive
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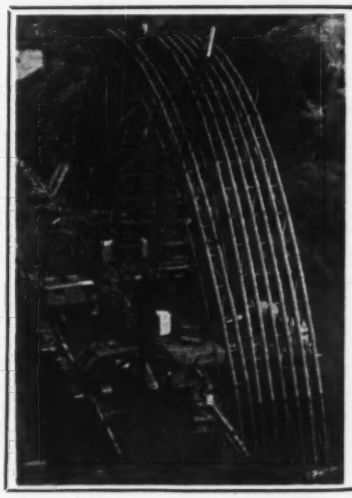

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OFFICIAL PROPOSALS

(Continued from page 87)

Bids: November 8, 1961

Construction of Canaveral Transmission System

EMPRESA NACIONAL DE ENERGIA ELECTRICA
HONDURAS, CENTRAL AMERICA

Sealed Bids (Contract Documents 180-5) will be received at Tegucigalpa, D.C., Honduras, C.A., until 4:00 P.M., local Honduran time, November 8, 1961 for Construction of the Canaveral Transmission System located in Honduras, Central America. The principal features of the work are as follows: Furnish and construct approximately 200 km of single circuit and 10 km of double circuit 138 kv transmission line complete on steel towers to be designed and furnished by the Contractor. One circuit of the double circuit line is to operate at 69 kv.

Design, furnish, and construct steel structures, buses, bus supports, conductors and fittings, insulators, miscellaneous accessories and shield wires for two substations, one of which is to be located at Tegucigalpa and one at San Pedro Sula.

Design and furnish only, steel structures, buses, bus supports, conductors and fittings, insulators, miscellaneous accessories and shield wire, for one substation to be located at Canaveral. Construction of this substation is to be done by others.

The Contract Documents require prequalification of bidders and the following information must be submitted for prequalification:

1. List of similar completed work or material with dates, total amount of contract and reference from clients.
2. List of equipment available for the work and ownership of same.
3. Statement of financial resources.
4. Banking references.
5. Qualifications and experience records of the personnel.
6. Other information by which fitness to submit a proposal can be judged.

All prequalification information must be sent to both the Empresa Nacional de Energia Electrica, Apartado Postal No. 99, Tegucigalpa, D.C., Honduras, Central America, and Harza Engineering Company, 400 West Madison Street, Chicago 6, Illinois, USA.

Contract Documents will automatically be issued to qualified bidders.

Bids must be submitted in triplicate in accordance with the Instructions to Bidders. A bid bond or certified check as guarantee will be required with each bid.

The right is reserved to make award on any bid or to reject any or all bids.

Payment for foreign expenditures for the construction of the project will be made from proceeds of a loan, guaranteed by the Republic of Honduras, from the International Bank for Reconstruction and Development to the Empresa Nacional de Energia Electrica. Payment for the local expenditures for the construction of the project will be made from proceeds of a Loan, guaranteed by the Republic of Honduras, from the Development Loan Fund to the Empresa Nacional de Energia Electrica.

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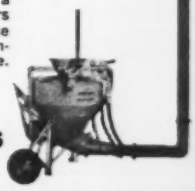

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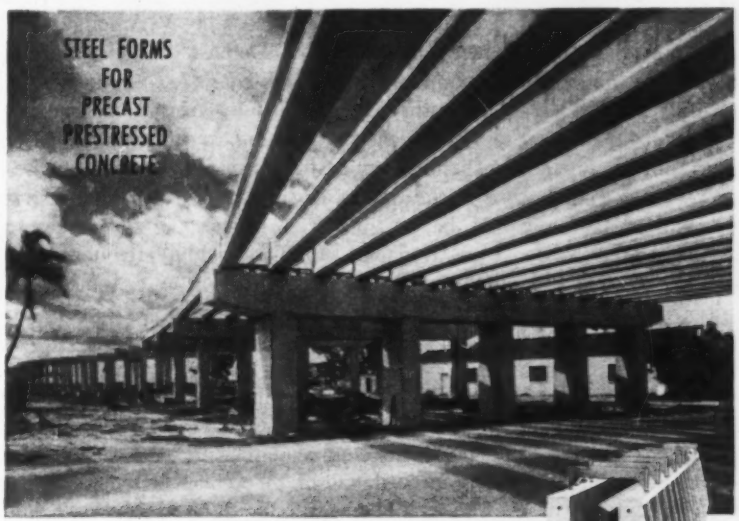

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Editorials

Shelters Need More Thought

HOME FALLOUT SHELTERS, in which there is a newly aroused public interest, require some more design attention and the assurance of better construction if they are to justify their promise of safety for those outside of or on the fringes of a nuclear blast. In so far as protection against radiation is concerned, the home shelter designs developed by the Office of Civil Defense and Mobilization (available in a 10-cent booklet from the U.S. Government Printing Office) are no doubt adequate. But there are still shortcomings represented by impractical ventilation equipment, inadequate waste and sewage disposal and the possibility of shoddy construction.

The danger of shoddy construction arises from the too-great encouragement being given to do-it-yourself building. Also, as pointed out by the House of Representatives' Government Operations Committee early this month, the shelter market is attracting "fly-by-night operators" (ENR Sept. 28, p. 19). The committee warned shelter buyers not to proceed without first consulting local authorities. Logically, this group should include a top building official as well as civil defense personnel. For public safety, all plans and construction of home shelters, and mass shelters too, should be inspected by a local building official.

Unsafe ventilation may result from filters that may pass radioactive dust or that may become clogged. To prevent this hazard, the new Office of Civil Defense should issue more specific requirements and design details than the old OCDM had issued.

Use of hand blowers for shelter air supply is another hazard, since occupancy of shelters may be necessary for long periods. Elimination of the danger of suffocation from human failure would be possible if a low-cost battery-operated blower were available. OCD should stimulate research and development of such ventilation equipment.

Waste and sewage disposal would not be a serious consideration were it not for the odor problem of the recommended disposal method—deposit in pails. For short stays in a shelter, chemicals could easily be an answer; but for long periods, close confinement with sewage disposal pails could conceivably lead to premature abandonment of the shelter. The maximum duration of stay in a shelter should, in fact, be a prime criterion of shelter design. Giving credence to the possibility of short stays can only lead to inadequate provisions for living in shelters.

Perhaps the answer to the waste disposal problem is to encourage shelter owners to spend more money to get a more suitable system—a chemical toilet, a detached toilet or some kind of mechanical ejector. There is additional opportunity and need for more research in this area of shelter design.

The House committee concluded that private, individual shelters are impractical for most Americans. But they need not be if reputable contractors and manufacturers would take over this market before fly-by-nighters ruin it, and if research can unearth economical solutions to problems still needing attention, principally waste disposal and ventilation.

Engineers and Foreign Aid

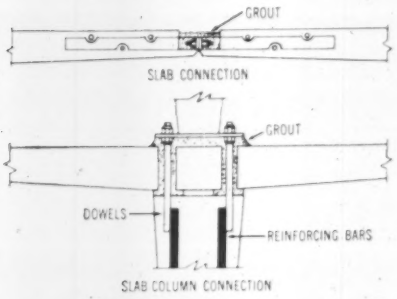
CHANGING THE NAME of the International Cooperation Administration (ICA) to the Administration for International Development (AID) does not of itself remove any of the difficulties that have plagued our foreign aid program. It does, however, afford a new opportunity to look for flaws, which have made the program less efficient than it should be.

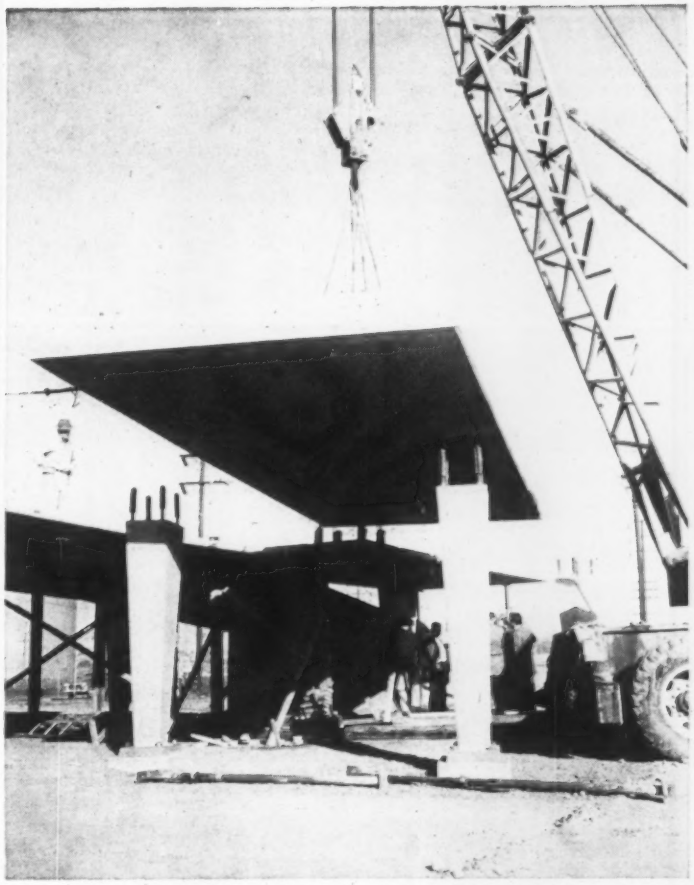
Usually the shortcomings of our foreign aid program have been attributed to unwise political decisions or poor administration. But since there have been situations where engineering and construction have also been blamed, there is a present responsibility for engineers, individually or as a profession, to lend whatever help and advice they can to improve the operations of AID.

In this connection several particularly thoughtful suggestions were made recently by Richard Hazen of the New York consulting firm of Hazen and Sawyer in a talk to the American Institute of Consulting Engineers. Among them were these two, which appeal to us as being especially timely:

- If ICA, now AID, would avail itself of the services of competent consultants to make a quick appraisal of the general feasibility of every proposed project, a good many unwise projects could be avoided. Once extensive field investigations are undertaken, projects automatically receive a status that is difficult to deflate. The frequent result is that political considerations and necessary face-saving cause uneconomic and impractical projects to be approved.
- If AID would contract with consulting engineering firms to place just one or two of their younger engineers on a foreign job for say a two-year period, the project would then also be in a position to benefit from assistance and advice from the consultants' entire home office staffs when and if that should ever be required. The objective would be two-fold—to provide AID with competent engineering at reasonable cost, and to enlarge the nation's supply of young engineers with foreign service experience.

Obviously neither of these suggestions, if adopted by AID, would result in lucrative engagements for consultants. Putting them into effect, however, could well enhance both efficiency and economy in our foreign aid operations. This, as Mr. Hazen pointed out, is a responsibility that engineers should assume in the national interest. More of this kind of thinking is desirable.





PHOTOS THROUGH COURTESY OF TISHMAN RESEARCH CORPORATION, NEW YORK, N. Y., DESIGNERS AND DEVELOPERS OF TIERPARK GARAGES

5000 psi in sixteen hours with SIKA SET

Grout and dry pack mortar with rapid strength development and minimal shrinkage is essential for the fast erection of the new Tierpark Parking Structures developed by Tishman Research Corporation. Composed of only three elements — slabs, columns and ramps — a Tierpark structure is erected within a matter of days.

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Structural concrete was initially retarded by the use of Plastiment Retarding Densifier to facilitate finishing — with rapid strength gain as an added bonus to the manufacturer of the precast, prestressed elements.

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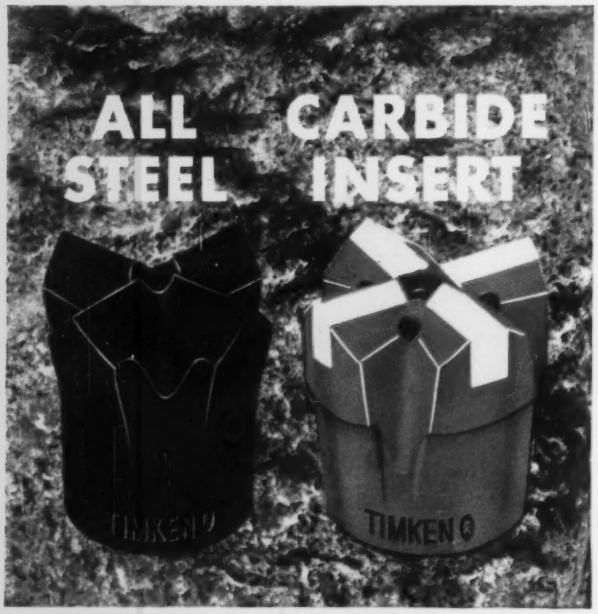

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